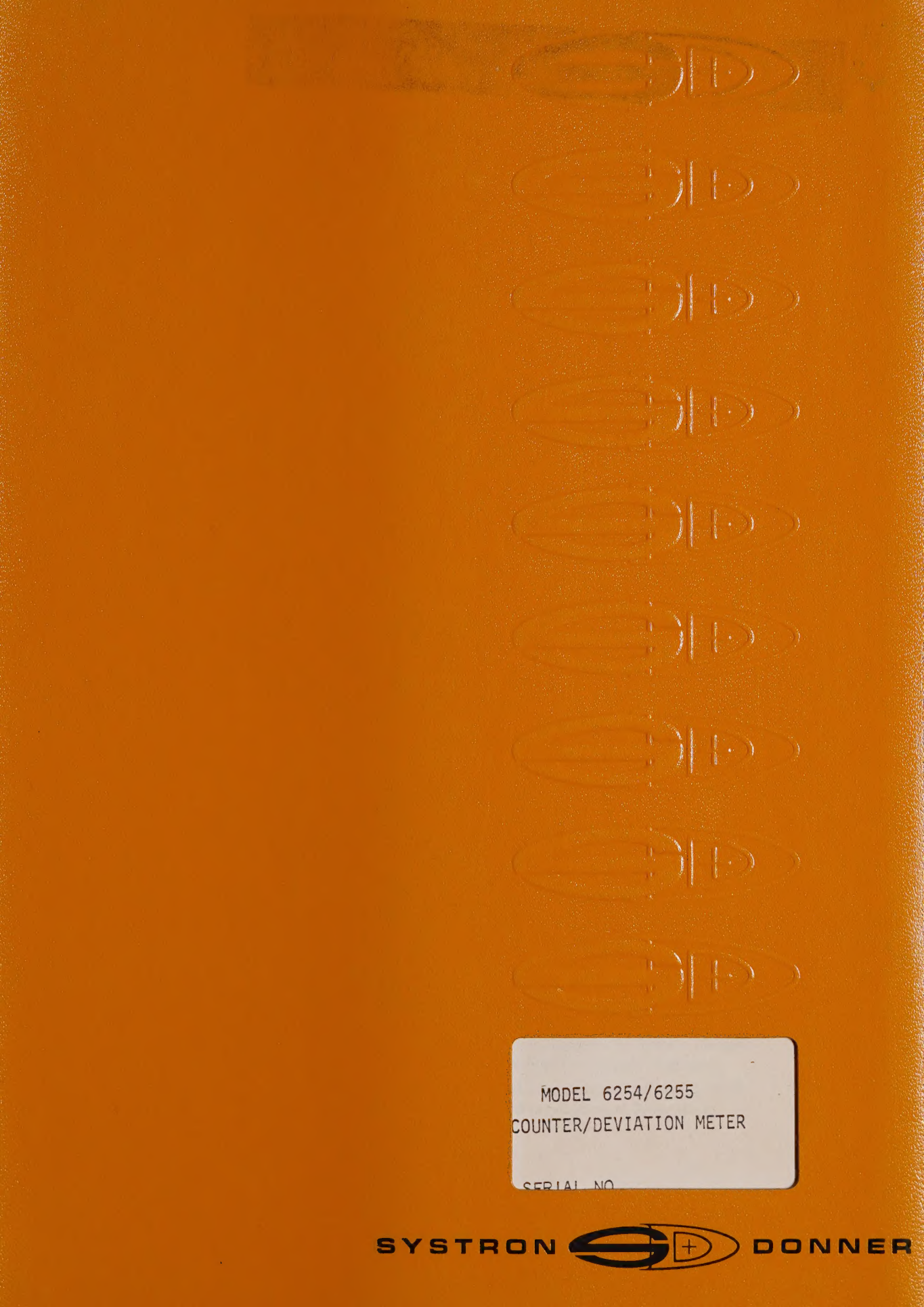
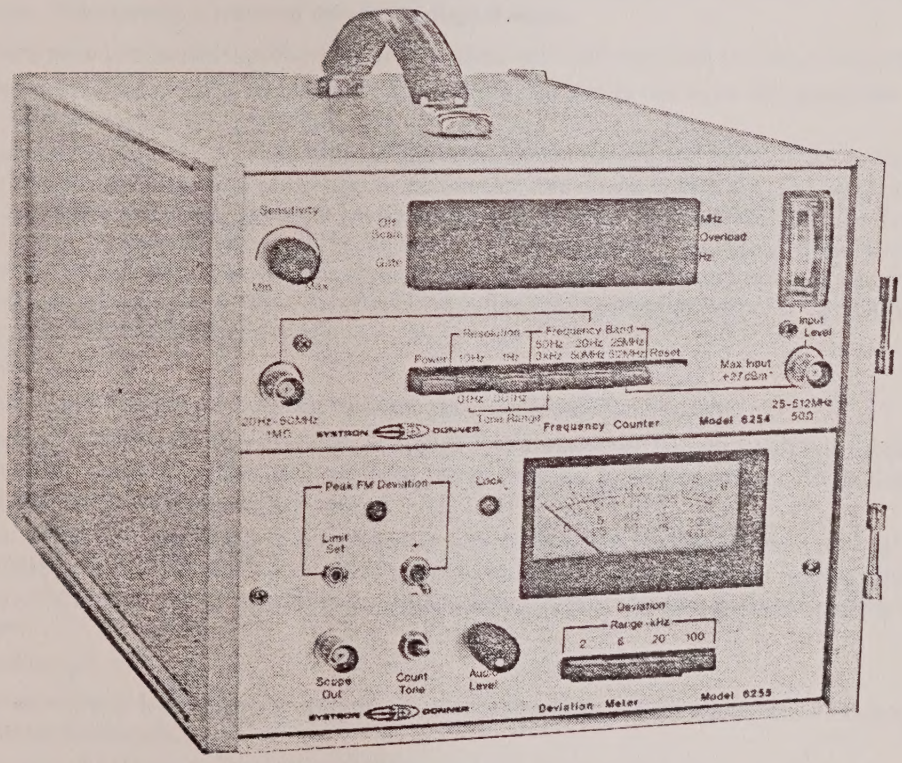


MODEL 6254/6255
COUNTER/DEVIATION METER

SERIAL NO.

SYSTRON DONNER

INSTRUCTION MANUAL



MODEL 6254/6255
COUNTER/DEVIATION METER

SERIAL NO.

Copyright © 1976 Systron-Donner Corporation

SYSTRON DONNER CORPORATION

CONCORD INSTRUMENT DIVISION
10 Systron Drive • Concord, California 94518 • U.S.A.
Tel: (415) 676-5000 • TWX: 910-481-9479 • Cable: SYSTRONDONNER

FSCM No. 52542

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_05177

TEST & MEASUREMENT GROUP
OF
SYSTRON DONNER
WARRANTY POLICY

I – Warranty

The Test & Measurement Group of Systron Donner warrants that at the time of shipment the products manufactured by Systron Donner's T&M Group and sold hereunder will be free from defects in material and workmanship and will conform to the specifications furnished by or approved in writing by Systron Donner's T&M Group.

II – Warranty

A – The warranty period for products published in our latest product catalog will be one year from the date of shipment. This warranty is extended only to the original buyer.

B – The warranty period for products published in prior catalog, will be 90 days from the date of shipment.

C – The warranty period for modified standard products, custom products, or new spare part assemblies will be 90 days from the date of shipment.

D – The warranty period for systems or assemblies of miscellaneous components and products will be limited to the warranty for the stand alone component or instrument. The system itself is not guaranteed unless a specific installation and service agreement has been negotiated between Systron Donner and the customer. In this latter case, the warranty period will be 30 days after the installation of the system while the various portions of the system will be limited to the normal component or instrument stand alone warranty, and for non Systron Donner material within the system that is furnished by Systron Donner the warranty will be limited to the suppliers normal warranty.

III – Warranty Adjustments

A – If any defect within this warranty appears, Purchaser shall notify Seller immediately.

B – Systron Donner's T&M Group agrees to repair or furnish a replacement for, but not install, any product which, within the standard warranty shall, upon test and examination by Systron Donner's T&M Group, prove defective within the above warranty period.

C – No product will be accepted for return or replacement without the written authorization of Systron Donner's T&M Group. Upon such authorization and in accordance with instructions by Systron Donner's T&M Group, the product will be returned to the original manufacturing location, shipping charges prepaid by Purchaser.

IV – Exclusions from Warranty

A – The foregoing warranty is in lieu of and excludes all other expressed or implied warranties of merchantability or fitness or otherwise.

B – Systron Donner's T&M Group will not be liable for any special or consequential damages or for loss, damages or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with any other equipment or material, or from any other cause.

C – The warranty does not extend to any product manufactured by Systron Donner's T&M Group which has been subjected to misuse, neglect, accident, improper installation or to use in violation of instructions furnished by Systron Donner's T&M Group.

D – The warranty does not extend to or apply to any unit which has been repaired or altered at any place other than at a Systron Donner T&M Group factory, by persons not expressly approved by Systron Donner's T&M Group, not to any unit, the serial number of which has been removed or defaced or changed.

E – This warranty applies to new equipment only and will cover repaired or replacement items only to the extent of the balance remaining of the items original warranty period noted above in Paragraph II.

F – All freight charges will be paid for by the Purchaser.

Divisions in the Test & Measurement Group include:

Instrument Division – Concord, CA
WM Division – Sacramento, CA
ACD Division – Sunnyvale, CA
SD GmbH – Munich, West Germany

SYSTRON DONNER

Member THORN EMI Group

For quality service on all SYSTRON DONNER products contact:

Factory Service

Systron Donner
Instrument Division
Customer Service
2727 Systron Drive
Concord, CA 94518
(415) 676-5000

Factory Authorized Service

General Electric Co.
Instrumentation &
Communication
Equipment Service
21 Madison Road
Fairfield, NJ 07006
(201) 227-7900

DETACH AND RETURN

PLACE STAMP HERE

Systron Donner

Instrument Division
Customer Service Department
2727 Systron Drive
Concord, California 94518

TABLE OF CONTENTS

PAGE

CHAPTER 1 - GENERAL INFORMATION

1.1 Introduction 1-1
1.2 Manual Applicability 1-1
1.3 Specifications and Options 1-1
1.4 Aging Rate 1-5
1.5 Logic Symbols and Notations 1-5

CHAPTER 2 - INSTALLATION

2.1 Introduction 2-1
2.2 Receiving Inspection 2-1
2.3 Reshipment 2-1
2.4 Power Requirements 2-2
2.5 Initial Circuit Check 2-2
2.6 Installation of Optional Model Combinations 2-2

CHAPTER 3 - OPERATION

3.1 Introduction 3-1
3.2 Front Panel Functions 3-1
3.3 Rear Panel Functions 3-3
3.4 Accuracy of Measurement 3-6
3.4.1 Oscillator Stability 3-6
3.4.2 Gating Error 3-7
3.5 Operating Procedures 3-8
3.5.1 Deviation Measurement of FM Signal 3-8
3.5.2 20 Hz to 50 MHz Frequency Band 3-9
3.5.3 50 Hz to 3 kHz, Tone Range 3-9

CHAPTER 4 - PRINCIPLES OF OPERATION

4.1 Introduction 4-1
4.2 Functional Description 4-1
4.3 Circuit Description 4-4
4.3.1 Logic Assembly, A1, Schematic #7-05377001 4-4
4.3.2 Readout Assembly, A2, Schematic #7-05528201 4-5
4.3.3 Amplifier Assembly, A3, Schematic #7-05311301 4-5
4.3.4 Prescaler Assembly, A4, Schematic #7-05349901 4-5
4.3.5 Oscillator Assembly, A5, Schematic #7-05349901 4-6
4.3.6 Automatic Deviation Analysis Meter, Schematic #7-05344101 4-6
4.3.7 Battery Options 4-7
4.3.8 Inverter Assembly, Schematic #7-055486, 7-055462 and 7-055485 4-7
4.3.9 Oscillator Inverter, Schematic #7-055486 4-8
4.3.10 Charger Assembly, Schematic #7-055462 4-8

CHAPTER 5 - CALIBRATION AND MAINTENANCE

5.1 Introduction 5-1
5.2 Test Equipment 5-1

PAGE

CHAPTER 5 - CALIBRATION AND MAINTENANCE (Contd)

5.3 Cover Removal 5-1
5.4 Deviation Meter Installation 5-2
5.5 Operational Test 5-2
5.5.1 Counter Functional Test 5-2
5.5.2 6255 Deviation Meter Functional Test 5-3
5.6 Calibration 5-5
5.6.1 Standard Oscillator and TCXO Calibration 5-5
5.6.2 High Stability Oscillator 5-5
5.7 Circuit Adjustment 5-6
5.7.1 Power Supply 5-6
5.7.2 Amplifier Assembly, A3 5-6
5.7.3 Prescaler Assembly, A4 5-6
5.7.4 Deviation Meter 5-7
5.8 Routine Maintenance 5-11
5.9 Printed-Circuit Board Repair 5-12

CHAPTER 6 - REPLACEABLE PARTS LIST

6.1 Introduction 6-1
Final Assembly 6-2
Universal Chassis Assembly #055069 6-3
Front Cover Assembly #055037 6-4
Rear Panel Assembly 6-5
A1, Logic P.C. Assembly D05377001 6-6
A2, Readout P.C. Assembly 8-Digit #055282 6-10
A3, Amplifier Assembly B05539101 6-12
A4, Prescaler P.C. Assembly C05349901 6-14
A5, Oscillator P.C. Assembly B05318301 6-18
Option 06, Battery Pack Final Assembly 6-19
Option 07, Final Assembly 6-20
A6, Power Inverter P.C. Assembly #05317501 6-21
Option 08, TCXO Oscillator Assembly #05318401 6-23
Options 11, 12 and 13 Oscillator Chassis 6-24
Option 12, High Stability Oscillator Assembly 6-25
Test Assembly Deviation Meter 6-26
A1 Adam PC Assembly #05344101 6-27
Option 05, Oscillator Power Inverter Assembly 6-38
Inverter P.C. Assembly #05543701 6-39
Option 06, Battery Charger Assembly #05543601 6-40
Option 05, External DC Supply Chassis Assembly 6-41
Option 06, 6V Battery Pack Assembly 6-42
Installation & Shipping Option 6 Battery Pack 6-43
Installation & Shipping Option 05 External DC 6-44
Installation & Shipping Option 07 External DC 6-45
Installation & Shipping Model 6255 6-46

CHAPTER 7 - DRAWINGS

7.1 Introduction 7-1
Counter Universal Chassis Assembly #055069 7-2

PAGE

CHAPTER 7 - DRAWINGS (Contd)

Counter, Interconnect Block Diagram #055073 7-4
Rear Panel Assembly #05368601 7-5
A1, Logic Assembly #05377001 7-6
A1, Logic Assembly, Schematic Diagram #7-05377001 7-7
A2, Readout Assembly, Schematic Diagram #7-05528201 . . . 7-9
A2, Readout Assembly #05528201 7-10
A3, Amplifier Assembly, Schematic Diagram #7-05589101 . . 7-11
A3, Amplifier Assembly #05589101 7-12
A4, Prescaler Assembly, Schematic Diagram #7-05349901 . . 7-13
A4, Prescaler Assembly #05349901 7-14
A5, Oscillator Assembly and Schematic Diagram #05318301 . 7-15
Oscillator Assembly, Option 11, 12, & 13 #7-055703 7-16
Oscillator Assembly, Option 11, 12, & 13 Schematic Diagram #7-055703 7-17
External DC Option 05, Schematic Diagram #7-055386 7-18
External DC Option 07, Schematic Diagram 7-19
Battery Pack Option 05, Schematic Diagram 7-20
Inverter Assembly #05543701 7-21
6-Volt Battery Pack Assembly 7-22
Test Assembly, Deviation Meter 7-23
Installation Drawing, Shipping Assembly Deviation Meter #055254 7-24
A1, Automatic Deviation Analysis Meter Assembly #05344101 7-25
A1, Automatic Deviation Analysis Meter, Schematic Diagram #7-05344101 7-26
Installation and Shipping Assembly Drawing, 6V Battery Pack, Option 06 #055459 7-28
Installation and Shipping Assembly Drawing, External DC Supply, Option 05 #055478 7-29
Installation ahd Shipping Assembly, External DC Supply, Option 07 #055475 7-30

LIST OF FIGURES

Figure 1.1 Aging Rate of Oscillator 1-5
1.2 Definition of Logic Levels 1-5
3.1 Front Panel Functions 3-4
3.2 Rear Panel Functions 3-5
3.3 Gating Ambiguity 3-7
4.1 Functional Block Diagram 4-2
4.2 Deviation Meter Simplified Block Diagram 4-3
5.1 Deviation Test Connections 5-4
5.2 Overload Set Test Connections 5-7

LIST OF TABLES

Table 1.1 Specifications 1-2
1.2 Counter/Deviation Meter Options 1-4
2.1 Optional Model Combinations Installation Data 2-2

PAGE

LIST OF TABLES

Table	3.1	Front Panel Functions	3-1
	3.2	Rear Panel Functions	3-6
	5.1	Test Equipment	5-1
	5.2	Filter Color Coding	5-9

CHAPTER 1
GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains the specifications, operating instructions, theory of operation and maintenance instructions for the Model 6254 and Model 6255 frequency modulated signal analysis system.

The system consists of the Model 6254 Frequency Counter with the Model 6255 Auto-tune Deviation Meter. The carrier frequency, deviation frequency, and deviation magnitude of a frequency modulated signal can be accurately measured using this system. In addition, an audio output is provided. A scope output allows observation of the deviation waveform. A manually set deviation limit provides a visual indication when the limit is exceeded. Deviation readout is selectable in 2, 6, 20, and 100 kHz ranges.

The Model 6254 may be used separately as a 20 Hz to 512 MHz frequency counter. An eight-digit readout is standard and includes a leading zero suppression feature for error free readings. A level meter, coupled to the RF input, provides a visual display of proper signal level to the operator. If an overload is connected to the input, a flashing overload indication is provided and the instrument is held in reset. Electrical protection for the RF input circuitry is provided by a diode bridge limiter. Available options include internal or external battery operation.and a choice of high stability oscillators.

Light weight, portability, and ease of operation combine to make this unique system a valuable addition for laboratory or field use.

1.2 MANUAL APPLICABILITY

This manual is applicable to all model combinations of the Counter/Deviation Meter; Model 6254 Frequency Counter only or Model 6254 Frequency Counter and Model 6255 Auto-tune Deviation Meter combined as one unit.

1.3 SPECIFICATIONS AND OPTIONS

The specifications for the frequency modulated signal analysis system are listed in Table 1.1. Options are listed in Table 1.2.

TABLE 1.1 SPECIFICATIONS

Frequency Counter Specifications

FREQUENCY MEASUREMENT	
DIRECT	
Range:	20 Hz to 50 MHz.
Resolution:	Selectable 1 Hz or 10 Hz.
Display:	MHz with autopositioned decimal point. Holds reading samples.
Accuracy:	±1 count ±time base accuracy.
Sensitivity:	25 mV rms.
PRESCALE	
Range:	25 MHz to 512 MHz.
Resolution:	Selectable 1 Hz or 10 Hz.
Display:	MHz with autopositioned decimal point. Holds reading between samples.
Accuracy:	±1 count ±time base accuracy.
Prescale Ratio:	10:1
Sensitivity:	50 mV rms.
TONE RANGE	
Range:	50 Hz to 3 kHz.
Resolution:	Selectable, 0.01 Hz/0.1 second or 0.001 Hz/second.
Display:	Hz with autopositioned decimal point. Holds reading between samples.
Accuracy:	±4 counts ±time base accuracy at one second.
INPUT CHARACTERISTICS	
20 Hz to 50 MHz Input:	
Impedance:	1 MΩ shunted by 25 pF.
Coupling:	AC coupled.
Attenuation:	Variable sensitivity control.
Maximum Input:	Without Damage: 500V peak (dc plug ac component) 250 Vrms, 20 Hz to 10 kHz. 50 Vrms, 10 kHz. 10 Vrms, 2 MHz to 50 MHz.

TABLE 1.1 SPECIFICATIONS (CONTD)

INPUT CHARACTERISTICS (Contd)	
25 MHz to 512 MHz Input:	
Impedance:	50Ω nominal.
Coupling:	AC coupling.
Maximum Input:	Usable input +27 dBm. Maximum continuous input without damage, +33 dBm. Overload indicator flashes and instrument is held in a reset condition for inputs in excess of +27 dBm.
STANDARD TIME BASE	
Aging Rate:	±3 parts in 10^7 per month.
Temperature Stability:	±5 parts in 10^6 for 0 to 50°C; typical ±2 parts in 10^6 from 20 to 40°C.
Line Voltage:	<±1 X 10^7 for a 10% line variation.
External Input:	1 MHz, 1 Vrms into 500Ω.
1 MHz Output:	TTL level (with INT/EXT switch in INT).
TEMPERATURE COMPONSATED CRYSTAL OSCILLATOR OPTION 08	
Aging Rate:	<±3 parts in 10^7/month.
Temperature Stability:	±1 part in 10^6 from 0 to 50°C.
Line Voltage:	<±1 part in 10^7 for 10% line variation.
External Input:	1 MHz at 1 volt rms into 1 kΩ.
HIGH STABILITY OSCILLATOR OPTION 12	
Frequency:	3 MHz.
Aging rate after warm-up:	±1 part in 10^9 per day.
Maximum warm-up for "OFF" periods to 1 week:	72 hours.
Frequency retrace for "OFF" periods to 24 hours:	1 hour to reach ±6 X 10^8 maximum.
Short term aging rate:	1 X 10^{10} rms, 1 second.
Voltage stability:	28V ±2V; ±5 X 10^{10} maximum.
Temperature stability:	<±2 parts in 10^{10}/°C typical.
Auto-Tune Deviation Meter Specifications	
DEVIATION METER	
Frequency Range:	25 MHz to 512 MHz.
Sensitivity:	50 mV rms.

TABLE 1.1 SPECIFICATIONS (CONTD)

DEVIATION METER (Contd)	
Residual FM:	Less than 150 Hz at 512 MHz.
Deviation Ranges:	2, 6, 20, and 100 kHz peak full scale Selectable positive or negative.
Deviation Accuracy:	±3% of full scale.
Over Deviation Indicator:	Adjustable visual indication of excessive deviation.
Frequency Response:	Modulation frequency response is flat from 50 Hz to 8 kHz on 6,20 and 100 kHz ranges. 50 Hz to 3 kHz on 2 kHz range.
Internal Speaker:	Level of de-emphasized audio output may be adjusted with audio level control.
Scope Output:	Provides linear audio output into a 10 kΩ load.
Count Tone:	Indicates frequency of the tone, from the discriminator output to the counter, for high resolution tone measurements. Deviation must be greater than 25% of full scale range. Resolution 0.001 Hz.
GENERAL SYSTEM INFORMATION	
Dimensions:	17.78 X 21.26 X 31.75 cm (7"H X 8-3/8"W X 12-1/2"D).
Weight:	8.05 kg net; 10.32 kg shipping. (16 lbs net; 21 lbs shipping).
Power:	115 or 230 Vac, selectable on rear panel. 50 to 440 Hz, 22W. 11 to 13.5 Vdc.
Fuse:	0.5A, 115 Vac; 0.125A, 230 Vac; 4A dc.
Operating Temperature:	0 to 50°C.

TABLE 1.2 COUNTER/DEVIATION METER OPTIONS

Model No.	Description
Option 05	High stability oscillator with external battery operation.
Option 06	Battery operation with internally installed batteries.
Option 07	External battery operation.
Option 08	Temperature compensated crystal oscillator (TCXO).
Option 12	High stability oscillator.

1.4 AGING RATE

Aging rate defines the average slope of the fractional frequency change of an oscillator plotted against time, (Figure 1.1). Long-term aging rate is expressed as the fractional change per day, week, or month. Short-term stability is expressed as the average fractional frequency change per second in a 120-second period.

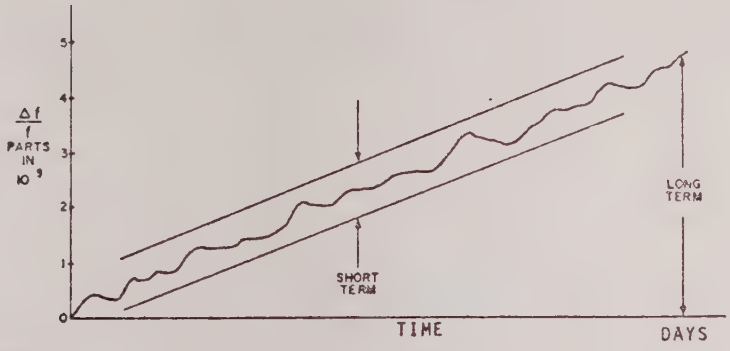


FIGURE 1.1 AGING RATE OF OSCILLATOR

1.5 LOGIC SYMBOLS AND NOTATIONS

Since most of the integrated circuit modules used in this instrument are DTL/TTL compatable, most signal levels are 0.0V to 0.8V LOW (L) and +2.4V to 5.0V HIGH (H) (see Figure 1.3). Symbols used conform to MIL STD 806B.

Integrated circuits using MECL levels are usually varied from -1.7 Vdc low to -0.9 Vdc high. The tri-state logic elements used as turn-on, turn-off gates will pass either a low signal or high signal without inversion when the gate is turned on.

The active state of logic line is identified with the absence or inclusion of bar notation over the signal name. For example: RESET: Indicates a high-level condition producing the active state of reset. $\overline{\text{RESET}}$: Indicates a low-level condition producing the active state of reset. In general, an open line to a logic symbol is considered a HIGH.

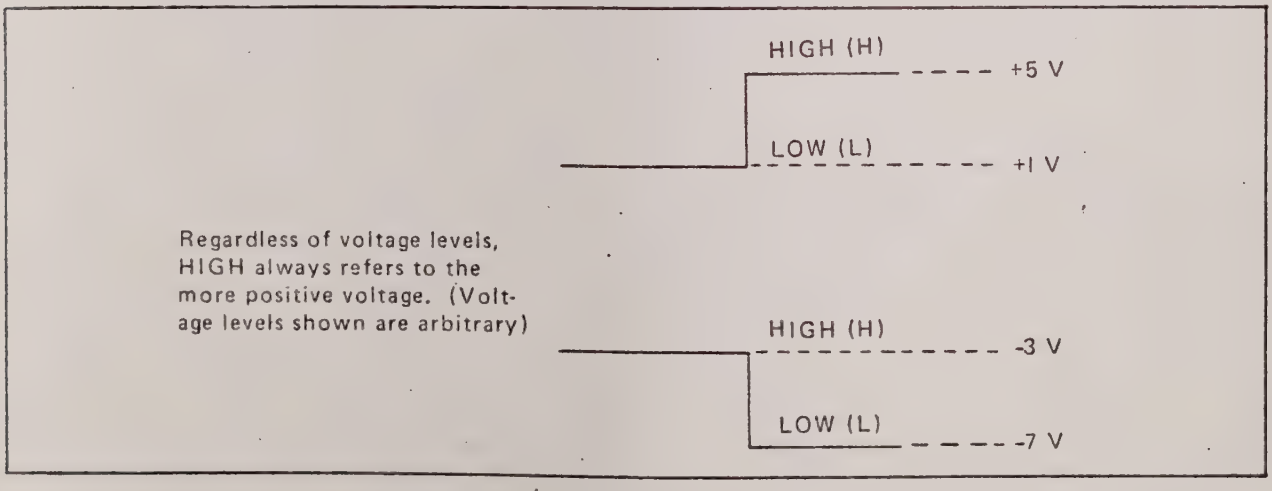


FIGURE 1.2 DEFINITION OF LOGIC LEVELS

CHAPTER 2
INSTALLATION

2.1 INTRODUCTION

This chapter contains procedures for inspection and initial installation of the Model 6254/6255 Frequency Counter/Deviation Meter. Instructions for reshipment have been included should it become necessary to return the instrument to the factory for service or repair.

2.2 RECEIVING INSPECTION

Prior to accepting the instrument from the shipper, inspect the condition of the shipping container for any indication of freight damage. Any sign of such damage must be noted by both the shipper and receiver; and should be reported to the insurance investigator.

Immediately following removal of the instrument from the shipping container, inspect for any possible physical damage incurred during shipment. Check surfaces for scratches or dents, broken or cracked knobs, and damaged connectors. Should any damage be found, notify your Motorola representative - - - DO NOT USE THE INSTRUMENT UNTIL INSTRUCTED TO DO SO BY THE REPRESENTATIVE.

2.3 RESHIPMENT

When the instrument is to be packaged for shipment, contact the nearest Motorola field office for shipping instructions. Use the original packaging materials or package the instrument following the general packing instructions.

GENERAL PACKING INSTRUCTIONS

1) Attach a tag to the unit indicating the model number, serial number, name and address of the instrument owner and a summary of the service or repairs required.

2) Wrap the instrument in heavy paper or plastic prior to placing it into the shipping container.

3) Select a strong carton or wooden box to house the instrument.

4) Use an adequate layer of shock-absorbing material on all sides of the instrument and protect the front panel with additional layers of cardboard. Be certain that there is no movement of the unit within the container.

5) Seal the package with strong tape or metal bands.

6) Mark the shipping container "FRAGILE-DELICATE INSTRUMENT" to ensure careful handling.

7) Be certain that all correspondence refers to full instrument nomenclature (model and serial number).

2.4 POWER REQUIREMENTS

The instrument is supplied with a standard three-conductor power cord which, when plugged into an appropriate power receptacle, grounds the chassis to protect operating personnel from certain electrical hazards. When the power cord is mated to a two-conductor outlet, an adpater plug, properly installed, will provide the same protection.

Power requirements are 115 or 230 Vac, 50 to 440 Hz, or 11 to 13.5 Vdc, and approximately 22W of power. Selection of line voltage is made by a switch on the rear panel. Fuse requirements are 0.5 amperes for 115, 0.25 amperes for 230V operation, and 4A for dc operation.

2.5 INITIAL CIRCUIT CHECK

Prior to connecting the instrument to the line voltage, ensure that the voltage selection switch is in the proper position and the correct fuse is installed. A system operation check is contained in Chapter 5, paragraph 5.5. If at any time the instrument does not meet or exceed the specifications listed in Table 1.1, check the oscillator frequency before performing corrective maintenance. See Chapter 5, paragraph 5.3 for cover removal.

2.6 INSTALLATION OF OPTIONAL MODEL COMBINATIONS

The installation instructions are included on the Installation and Shipping Assembly Drawings located in Chapter 7 of this manual. Table 2.1 lists the different model combinations with the drawing title and page number, that provides the required installation information. Replaceable Parts Lists of the Installation and Shipping Assemblies are included in Chapter 6 of this manual.

TABLE 2.1 OPTIONAL MODEL COMBINATIONS INSTALLATION DATA

Option	Drawing Title	Page No.
Model 6255	Installation ahd Shipping Assembly Drawing, Deviation Meter, #055254	7-24
Option 05	Installation and Shipping Assembly Drawing, External DC Supply, Option 05, #055487	7-29
Option 06	Installation and Shipping Assembly Drawing, 6V Battery Pack, Option 06, #055459	7-28
Option 07	Installation and Shipping Assembly Drawing, External DC Supply, Option 07 #055475	7-30

CHAPTER 3
OPERATION

3.1 INTRODUCTION

This chapter contains a description of the front and rear panel controls, connectors, and indicators. Information covering factors which effect measurement accuracy and step-by-step operating procedure for each of the operating modes is included.

3.2 FRONT PANEL FUNCTIONS

Table 3.1 describes the controls, connectors, and indicators located on the front panel of the instrument. Refer to Figure 3.1 for index number location.

TABLE 3.1 FRONT PANEL FUNCTIONS

Index	Name	Description
1	Range - kHz	Interlocked pushbutton switches select the FM range, in kHz, to be measured.
2	Deviation	Meter shows percentage of deviation of range selected.
3	Lock	LED indicator lights when the harmonic generator is locked to the input signal.
4	25-512 MHz 50 Ω	BNC connector accepts signals between 25 MHz and 512 MHz when 25 MHz - 512 MHz frequency band is selected.
5	Reset	Momentary pushbutton switch, when depressed will set all indicators and control functions to the zero state. When the switch is released, a new sample will commence.
6	Frequency Band 50 Hz - 3 kHz	Selects the 20 Hz - 50 MHz input BNC connector. Provides a X1000 multiplication for signals between 50 Hz and 3 kHz. Resolution switch .01 Hz or .001 Hz may be selected.
	20 Hz - 50 MHz	Selects the 20 Hz - 50 MHz input BNC connector. Provides a direct count of input signals between 20 Hz and 50 MHz. 1 Hz or 10 Hz resolution may be selected.

TABLE 3.1 FRONT PANEL FUNCTION (CONTD)

Index	Name	Description
	25 MHz - 512 MHz	Selects the 25 MHz - 512 MHz input BNC connector. Provides a prescaled count of input frequencies between 25 MHz and 512 MHz. 1 Hz or 10 Hz resolution may be selected.
7	Input Level	This meter provides a relative input level indication of the 25 - 512 MHz frequency band. Input amplitude is within acceptable limits when the meter reads in the green portion of the dial.
8	Display/Overload	LED indicator, when flashing, shows that a signal amplitude exceeding +27 dBm has been applied to the 25 - 512 MHz input connector.
9	Display/MHz	LED indicator, when lit, shows the measurement to be in MHz as read from the decimal point. Will light when either the 20 Hz - 50 MHz or 25 MHz - 512 MHz range is selected.
10	Display/Hz	LED indicator, when lit, shows the measurement to be in Hz when read from the decimal point.
11	Display/Digits	These eight-digit, seven-segment, display tubes, indicate the measurement data with decimal point.
12	Display/Off Scale	LED indicator lights when the display exceeds 9999999.9.
13	Display/Gate	LED indicator flashes showing the opening and closing of the count gate.
14	Sensitivity	Rotary knob, controlling a potentiometer, provides a variable attenuation to signals applied to the 20 Hz - 50 MHz input connector. Maximum attenuation is attained in the full counterclockwise direction.
15	Resolution 10 Hz	Interlocked pushbutton switch selects 10 Hz resolution when either the 20 Hz - 50 MHz or the 25 MHz - 512 MHz frequency band is selected. Selects .01 Hz resolution when the 50 Hz - 3 kHz frequency band is selected.

TABLE 3.1 FRONT PANEL FUNCTIONS (CONTD.)

Index	Name	Description
	Resolution (contd)	
	1 Hz	Interlocked pushbutton switch selects 1 Hz resolution when the 20 Hz - 50 MHz or the 25 MHz - 512 MHz frequency band is selected. Selects .001 Hz resolution when the 50 Hz - 3 kHz frequency band is selected.
16	Power	Push-on push-off switch applied power to the instrument in either ac or battery operation. Charges the internal batteries when the instrument is connected to ac and internal batteries are installed.
17	20 Hz - 50 MHz 1MΩ	BNC connector accepts signals between 20 Hz and 50 MHz when any frequency band except 25 MHz - 512 MHz is selected.
18	Peak FM Deviation	LED indicator lights when the preset deviation limit is exceeded.
19	Limit Set	A screwdriver adjustable potentiometer sets the maximum FM deviation desired by the operator.
20	+ Switch -	Toggle switch selects either positive or negative FM deviation.
21	Scope Out	BNC connector provides output for visual observation of the tone frequency waveform on an oscilloscope.
22	Count Tone	Spring-return toggle switch connects the tone frequency to the frequency counter while held in position.
23	Audio Level	Knob, controlling a potentiometer, adjusts the audio output level of the deviation meter.

3.3 REAR PANEL FUNCTION

The Controls and Connectors mounted on the rear panel of the instrument are described in Table 3.2. Refer to Figure 3.2 for index number location.

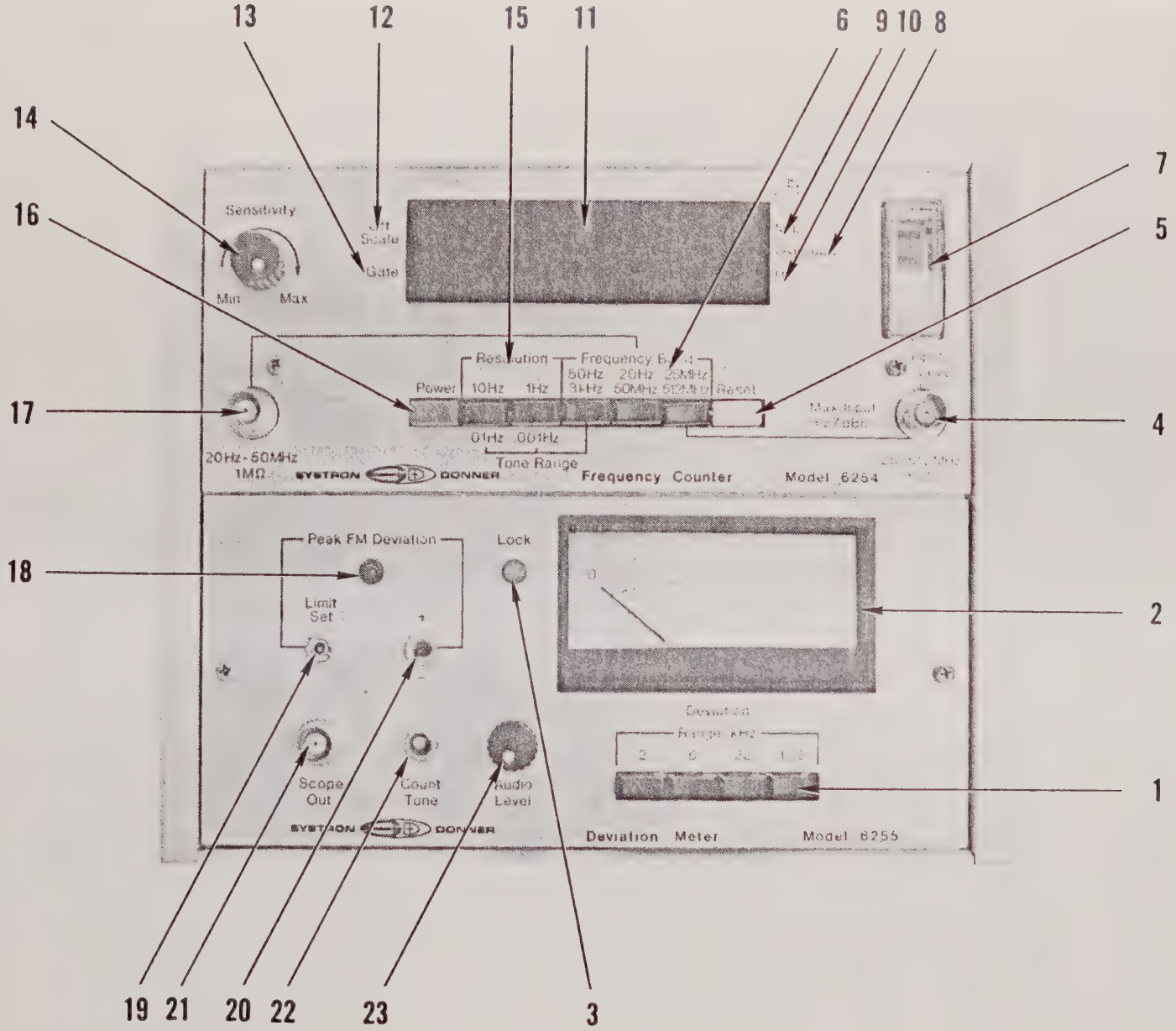


FIGURE 3.1 FRONT PANEL FUNCTIONS

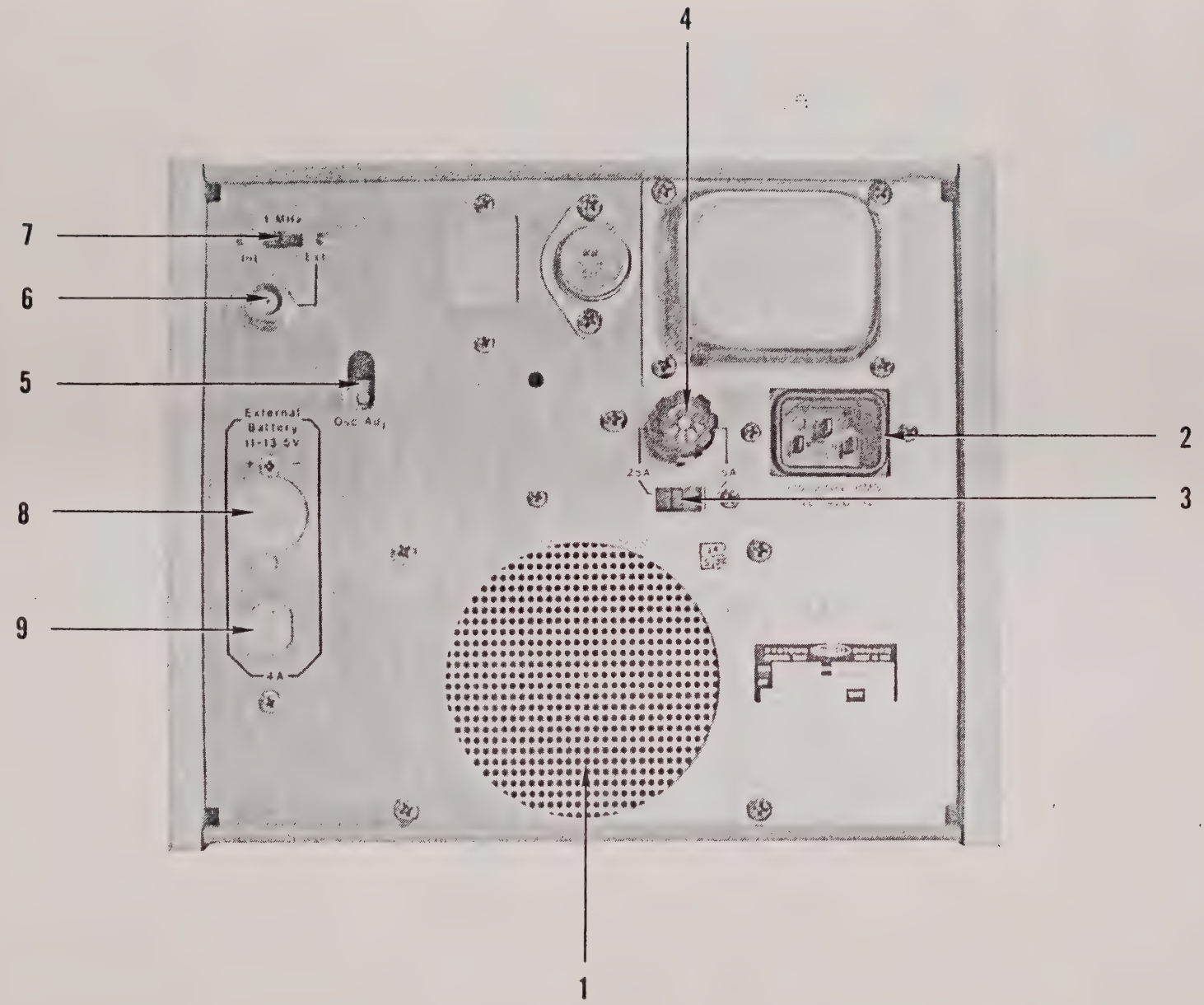


FIGURE 3.2 REAR PANEL FUNCTIONS

TABLE 3.2 REAR PANEL FUNCTIONS

Index	Name	Description
1	Speaker Cover	Cover for the instrument speaker.
2	AC receptacle	Connector socket allows connection of ac power to operate the instrument.
3	115-230	Slide switch provides for selection of 115V or 230V ac power input.
4	Fuseholder	AC power fuse, 0.5A, 115V or 0.25A, 230V.
5	Osc Adj	Provides access for adjusting the internal oscillator.
6	1 MHz	BNC connector provides input for operation with an external 1 MHz time base, or TTL 1 MHz out with INT/EXT switch in INT.
7	Int - Ext	Slide switch selects either internal time base or a time base from an external source.
8	External Battery	DC connection for operation on an external battery.
9	11 - 13.5V 4A	Fuse holder for external battery fuse.

3.4 ACCURACY OF MEASUREMENT

Two factors which may cause measurement errors in the counter are oscillator stability and gating error. Methods of minimizing these errors are contained in the discussions below.

3.4.1 Oscillator Stability

The gating precision, and, therefore, the accuracy of the count, is dependent upon the stability of the internal oscillator.

In the standard instrument, the oscillator is initially set to within ±1 part in 10^7 of a 1 MHz frequency standard having at least an order of magnitude higher stability.

Deviation of the counter oscillator from this frequency then becomes a function of several factors; the most significant being time. Due to certain processes in the frequency determining elements of the oscillator, an "aging" rate is established that can be measured and specified for the oscillator. This aging rate is specified to be less than ±3 parts in 10^7 per month. Generally, this aging rate decreases

with time (providing the instrument remains continuously energized). The error due to oscillator instability may be estimated from:

$$\text{Max \% error} = (\pm 3/10^7 \text{ X M}) \text{ X } 100$$

where: M is the number of months since last calibrated.

Oscillator stability is also a function of line voltage and temperature. To achieve the highest accuracy of measurement, the following considerations apply:

1) Maintain the instrument plugged-in and continuously energized.
2) Maintain constant environmental conditions.
3) Monitor or regulate line voltage.
4) Calibrate instrument at intervals consistent with maximum allowable error.

3.4.2 Gating Error

All types of digital measuring instruments are subject to an irreducible ±1 count ambiguity in the least significant digit of the display. This error is possible because the signal counted is not coherent (synchronized) with the time base pulses that control the signal gate. As illustrated in Figure 3.3, the first or last cycle of the input signal may or may not, pass through the signal gate during the selected measurement interval.

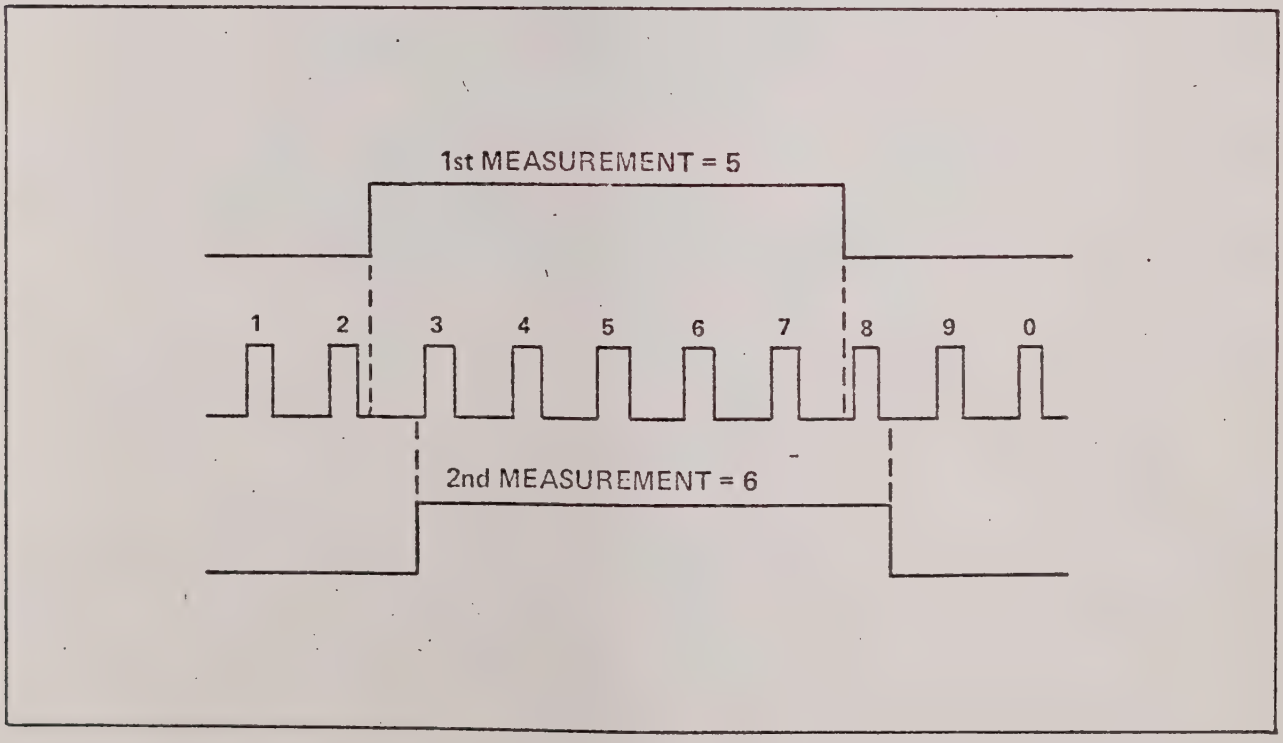


FIGURE 3.3 GATING AMBIGUITY

As measured frequency is increased, the percent of error due to the ±1 count ambiquity is reduced, since it becomes less significant compared to the total count. In any case, the maximum percentage of error is a function of the frequency measured and the number of pulses counted; i.e., the time base selected, and may be expressed by:

$$\text{Max \% error } (\leq 100\%) = \pm\frac{1}{fxT} \text{ X } 100$$

where: f is the frequency measured in Hz and T is the selected time base in seconds. Thus, to measure 1 MHz with a maximum gating error of ±0.001%, a 10 Hz resolution must be utilized.

3.5 OPERATING PROCEDURES

The instrument may be operated as an FM signal analysis system in the 25 MHz to 512 MHz range or as a frequency counter in all ranges. When in the 25 MHz to 512 MHz frequency range, the deviation meter is automatically connected and the FM deviation will be shown on the counter display. When the COUNT TONE switch is held in the closed position, the counter is switched into the tone range and will display the modulation frequency. This frequency must be at least 25% of the full scale range selected for the deviation range in kHz. Resolution will be .001 Hz.

A signal connected to the 20 Hz - 50 MHz input connector may be measured using either the 20 Hz - 50 MHz or the 50 Hz - 3 kHz frequency range dependent upon signal frequency. *Ensure that the voltage selection switch is in the proper position for the input line voltage before operating the instrument.*

3.5.1 Deviation Measurement of FM Signal

To measure the deviation of a frequency modulated signal, from 25 MHz to 512 MHz, use the following procedure.

1) Ensure the instrument is connected to the correct line voltage, or battery voltage if alternate source utilized.

2) Depress the power switch.

3) Depress the 25 MHz - 512 MHz FREQUENCY BAND switch.

4) Depress the desired RESOLUTION switch, 1 Hz or 10 Hz.

5) Set the rear panel INT/EXT switch to INT, or set the switch to EXT and connect a 1 MHz, 1 Vrms into 500 ohm, external time base to the 1 MHz BNC connector.

6) Select the desired deviation range, in kHz, 2, 6, 20, or 100.

7) If visual observation of the modulation waveform is desired, connect the SCOPE OUT BNC connector to the vertical input of the oscilloscope.

8) Connect a frequency modulated signal, 25 MHz to 512 MHz, minimum amplitude 50 mV rms, to the 25 MHz - 512 MHz BNC connector. (If an overload condition exists, the OVERLOAD indicator will flash).

9) Select the desired deviation, positive or negative.

10) The LOCK indicator on the deviation meter will light. The carrier frequency can be read directly from the counter and the deviation directly from the deviation meter.

11) The peak deviation indicator will light when the deviation percentage limit for the selected range is exceeded.

12) For measurement of a non-frequency modulated signal in the 25 MHz to 512 MHz band, use the above procedure. The frequency is read directly from the counter display, deflection of the deviation meter will indicate noise on the signal source.

3.5.2 20 Hz to 50 MHz Frequency Band

1) Ensure the instrument is connected to the correct line voltage or battery voltage if alternate source utilized.

2) Depress the power switch.

3) Depress the desired resolution switch, 1 Hz or 10 Hz.

4) Set the rear panel INT/EXT switch to INT, or set the switch to EXT and connect a 1 MHz, 1 Vrms into 500 ohm, external time base to the 1 MHz BNC connector.

5) Turn the sensitivity control fully counterclockwise.

6) Connect a signal, 20 Hz to 50 MHz, 25 mV rms minimum, to the 20 Hz - 50 MHz BNC connector.

7) Adjust the sensitivity control as required for a stable reading.

8) Read the frequency directly from the display.

3.5.3 50 Hz to 3 kHz, Tone Range

1) Follow the same procedure as for the 20 Hz to 50 MHz range except depress the 50 Hz - 3 kHz FREQUENCY BAND switch. Connect a 50 Hz - 3 kHz signal to the 20 Hz - 50 MHz BNC connector.

2) The resolution will be .001 Hz or .01 Hz as selected by the resolution switch.

CHAPTER 4

PRINCIPLES OF OPERATION

4.1 INTRODUCTION

This chapter contains a functional description of the counter/deviation meter frequency modulated signal analysis system at the block diagram level. Individual assemblies are described in sufficient detail to assist the technician in understanding and troubleshooting the system.

4.2 FUNCTIONAL DESCRIPTION

The system consists of two basic units. A 20 Hz to 512 MHz frequency counter, which can operate independently, and an auto-tuned frequency modulation receiver which drives the deviation meter circuitry. Figure 4.1 is a functional block diagram of the system and Figure 4.2 is a functional block diagram of the deviation meter.

The frequency counter consists of front panel controls, input amplifier-shaper, multiplier, function select logic, function control logic, time base, oscillator reference, decade counter, readout unit, and power supply. The frequency band switches on the front panel connect the appropriate circuit for the particular measuring function through the function select logic. The resolution switches select a time base reference signal. The combined condition of the two switches determines the proper decimal point placement and measurement unit indicator in the readout.

When an unknown signal is applied to the instrument, the input amplifier-shaper converts the signal to a rectangular waveform. This waveform is converted into counting pulses which are directed to the decade counters when the count gate is opened by the selected time base.

The serial data is converted into BCD format by the decade counters. The BCD data is then decoded into seven line outputs by the decoder driver. The decoder/driver drives the seven-segment readouts which indicate the measurement. A separate decoder/driver provides decimal point placement on the readout. Display time of the measurement, independent of gate time, is fixed at approximately 100 μs. The readout continuously displays the most recent measurement at the end of each gate time.

When a signal is connected to the 25 MHz-512 MHz input connector, the signal is automatically connected to the input of the auto-tune deviation meter through a PIN diode leveler circuit. The signal is mixed with a local oscillator to obtain a 10.7 MHz intermediate frequency. Discriminator output is used to control ramp generation which tunes the voltage controlled local oscillator. The intermediate frequency is detected and amplified to provide outputs to the lock indicator, oscilloscope, and deviation meter. The tone range can be coupled back to the counter for a direct frequency count.

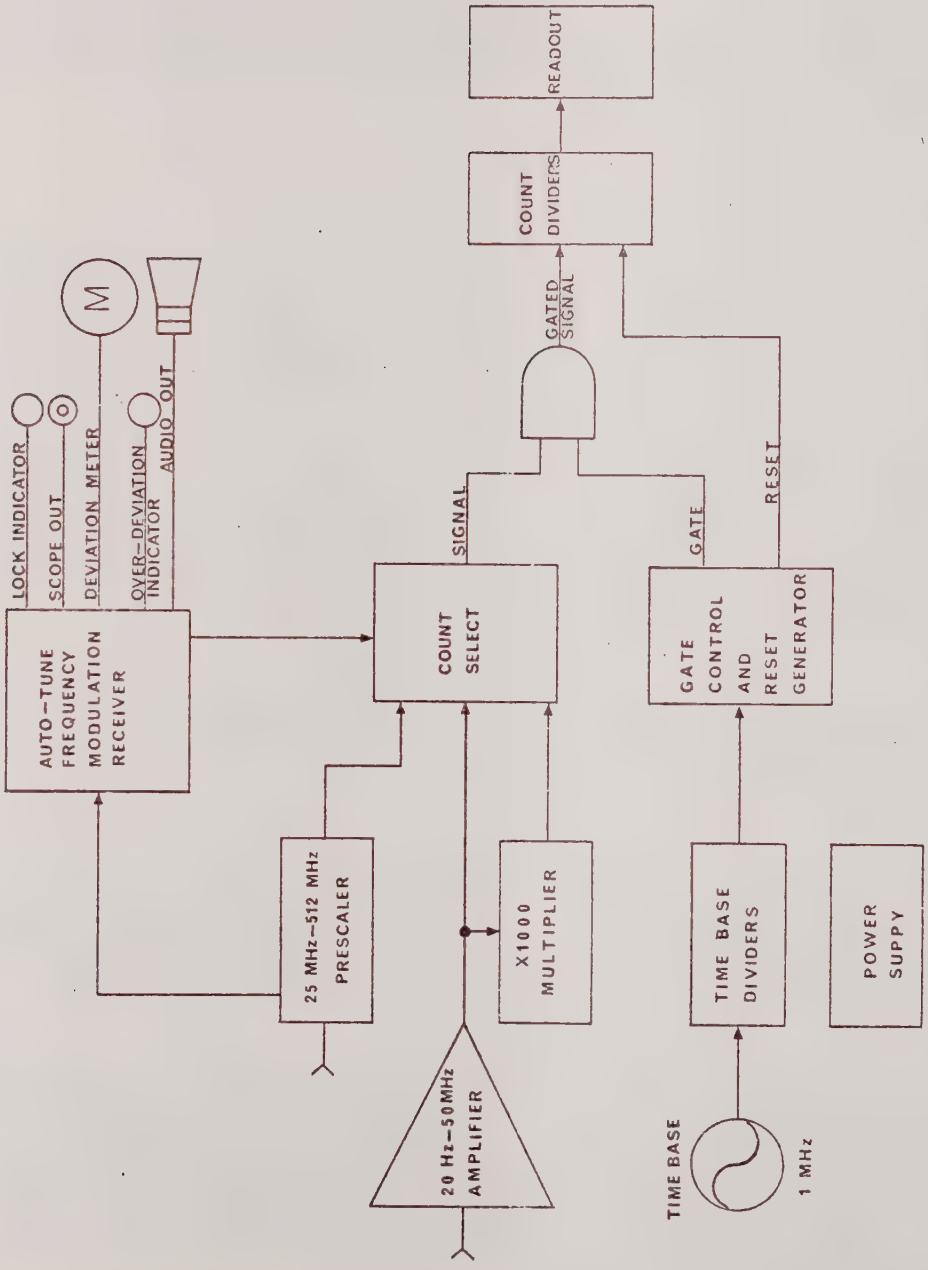


FIGURE 4.1 FUNCTIONAL BLOCK DIAGRAM

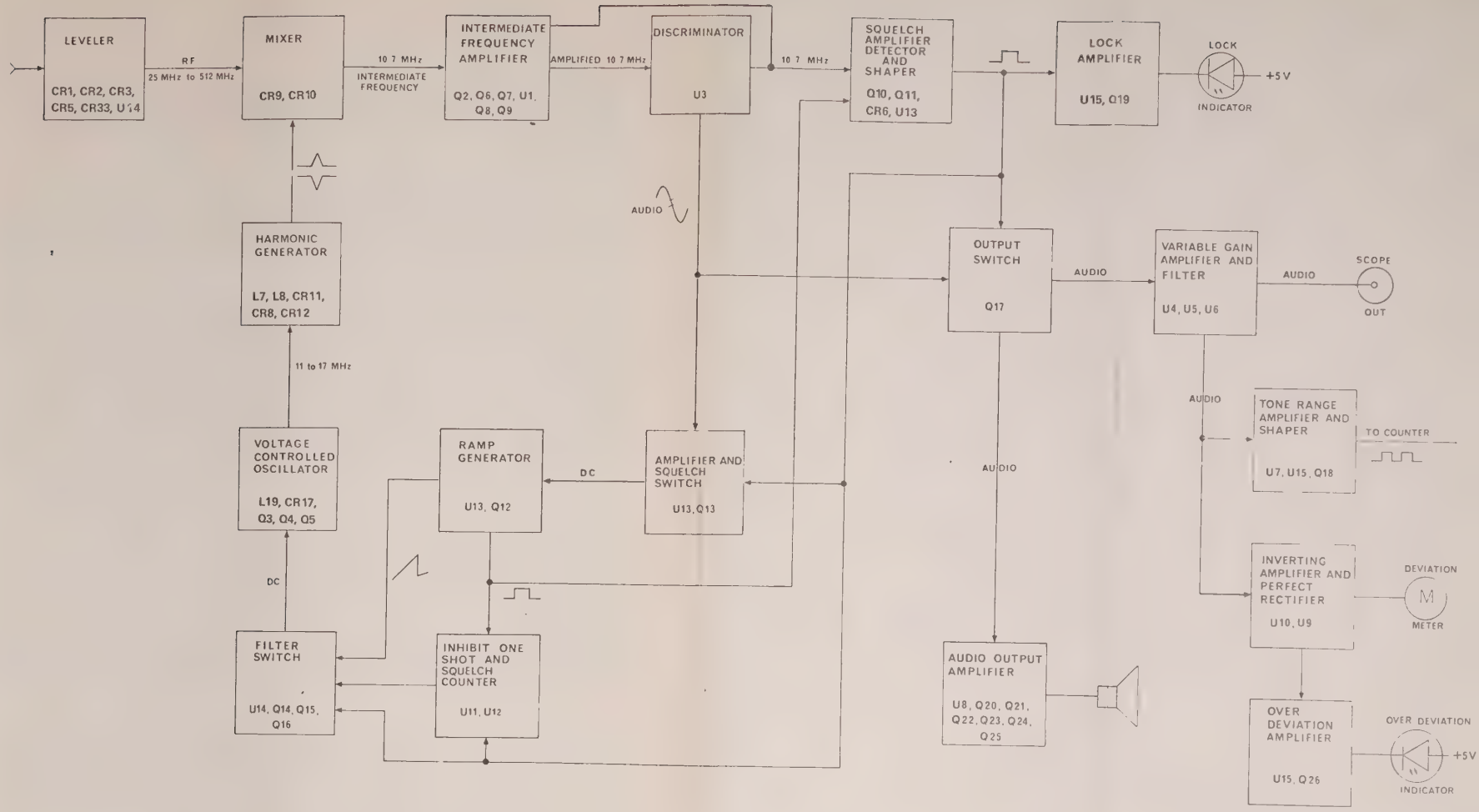


FIGURE 4.2 DEVIATION METER
SIMPLIFIED BLOCK DIAGRAM

4.3 CIRCUIT DESCRIPTION

In the following circuit descriptions, interconnect wiring references are shown in Interconnect Wiring Schematic #7-055073. Throughout the descriptions, reference designators and assembly connections are abbreviated except where clarity demands the full designator. For example, A1U7 is referred to as U7, A1 pin 27 is, referred to as A1-27.

4.3.1 Logic Assembly, A1, Schematic #7-05377001

The Logic Assembly consists of ten interdependent circuit groups; power supply, time base, control binaries count gate, control, zero suppression, decimal and legend logic, count chain, multiplex, offscale and gate light, and frequency multiplier.

The power supply consists of line filters L1, C1, L2, C2, transformer T1, and two full wave rectifiers, along with control and regulating circuitry. The dc outputs are +9V which is applied to U1 and Q3 tc produce +5V, -18V which is applied to U2 for regulation to -12V, and unregulated +18V and -18V which are supplied to the deviation meter. Regulators U1 and U2 are mounted on the rear panel and left rail respectively.

Time base selection is accomplished by controlling U31, programmable divider chain containing six programmable decades. The 10 MHz frequency standard is divided by U3 to provide a 1 MHz clock frequency. The time base is selected by depressing the desired RESOLUTION and FREQUENCY BAND switches. When the internal/external switch on the rear panel is in the internal position, the 1 MHz clock frequency is available at rear panel BNC connector.

The control binaries, U32, U33 accept start-stop information from the time base divider, U31. The second section of U32 is the first binary of the count chain. This section is controlled by U35-5, while counting inputs from U22.

Recycling of the instrument is accomplished through the reset one-shot, U15, C21. The fixed recycle rate is controlled by one-shot U8, C20. The transfer one-shot, U46, C22 updates the display at each end-of-count signal.

Zero suppression is controlled by the most significant digit. At reset, the decade counters to the left of the decimal are set to "15". The first counter pulse will change the output to "1" and they will then count up through "0". As each counter is strobed, the output is sensed by U27. If the "8" and "4" are present, a blanking pulse will be developed through the decoder-driver circuit in the readout.

Decimal and legend information is selected by the resolution and frequency band switches. Decimal information is sensed by U29-6 and U24-3, which provide the required drive for the decimal point indicators. Legend information is developed by U24-8, 11, to drive the legend indicator.

The count chain consists of U32, U33, and U37 through U44. U42 is the storage element and transfer for the high speed decade U32, U33. U37 through U41 and U43, U44, are combined decade counter/storage devices which can parallel outputs for multiplexing purposes. Blanking information is developed from the "8" and "4" outputs of these devices.

Multiplex is accomplished by the free running oscillator U36, clock register U35, and decoder U34. The decoder times the sequence of multiplexing and the readout is interlaced multiplex for a proper visual indication.

Off scale is sensed by U20, U25, and U26. The circuit is designed so that U25-5 and U25-9 will assume the same state at each transfer pulse. When the most significant digit, U44, overflows, U5-5 toggles, enabling U26-11. The next transfer pulse toggles U25-9, and turns the off-scale light on.

The frequency multiplier is a phase/frequency-locked voltage controlled oscillator. U7 is a phase/frequency detector driving buffer amplifier Q6. The oscillator consists of Q7, Q9, U23-8, 6, Q10, and Q8. Output of U7-8 is a voltage which varies with the phase/frequency difference of the audio frequency input from the deviation meter and the oscillator output through the divide-by-1000 circuit, U11, U12, and U13. The resultant output, through U20-8, is a frequency 1000 times the audio frequency, phase locked to the audio frequency.

4.3.2 Readout Assembly, A2, Schematic #7-05528201

The readout assembly consists of an eight-digit LED display, related drivers, a BCD-to-decimal decoder/driver, and a BCD-to-seven-segment decoder/driver. Each LED readout contains a decimal point indicator and seven LED's which are configured in the form of a boxed eight. The Decimal point information is decoded by BCD-to-decimal decoder/driver U2 and applied to readouts DS1 through DS7. Decoder/driver U1 decodes BCD information and provides seven lines of segment information for each readout thereby providing measurement indications. Output disable signals from the decade counters in the logic assembly sequentially gate the decoded segment information into each readout. The logic assembly also provides signals to light front panel indicator LED's CR1 through CR4.

4.3.3 Amplifier Assembly, A3, Schematic #7-05589101

The amplifier consists of a variable attenuator, an impedance changing circuit, Q1, a gain circuit, U1, U2, Q4, and a shaper, U3, along with associated circuitry for each.

The effective sensitivity is varied by the sensitivity control, R18. Voltage gain is obtained in U1, U2, and current gain in Q4. The operating level of Q6 is varied by the trigger level control, R13, to set the Q6 output level to the input level required by Schmitt trigger, U3. The outputs of U3-11 and U3-8 are used to drive the 20 Hz-50 MHz circuitry on the logic board.

4.3.4 Prescaler Assembly, A4, Schematic #7-05349901

The prescale assembly is comprised of the prescaler circuit and the overload circuit. Input is through the 25 MHz-512 MHz BNC connector. Prior to the prescale circuit, the input signal is routed through the divider network, R1, R2, R3, to the deviation meter. It is also routed to the overload circuit.

Input to the prescale circuit is through diode limiter CR2, CR3, CR4, CR5. Q1 through Q5, with the related circuitry, is a broadband amplifier feeding the scale-of-ten circuit, U3. The amplifier is balanced through potentiometer R24. The output of U3, one-tenth the input frequency, is buffered and level converted in Q6, Q7. The output is applied to the logic board to be counted through A1U22.

The overload circuit consists of U1, U2, U4, and associated circuitry. The detected input signal is applied to one input of U1, the other input is a divider network from +5V to -12V. Meter zero level is controlled by potentiometer R11. The output of U1 drives the level meter and is applied to U2. When the input level to U2 exceeds the overload level set by potentiometer R51, Q8 conducts, turning on Q9, to drive U4. The output is applied to the logic board to light the overload indicator. The indicator will flash until the overload is removed.

4.3.5 Oscillator Assembly, A5, Schematic #7-05349901

The 10 MHz oscillator consists of a quartz crystal controlling a Colpitts circuit. This oscillator provides the standard frequency to which all unknown frequencies are compared. The output can be calibrated to a standard by adjusting the variable capacitor, C2.

4.3.6 Automatic Deviation Analysis Meter, Schematic #7-05344101

Input is through J1 to a PIN leveling circuit composed of CR1, CR2, CR33, CR3, CR4, CR25, U14 and associated circuitry. The output is applied to a balanced harmonic mixer, L7, L8, CR8, CR9, CR10, CR11 and CR12 and mixed with the local oscillator frequency. The mixed signal is applied to a 10.7 MHz intermediate frequency (IF) amplifier, Q2, Q6, Q8, Q9 and U1.

There are two outputs from the IF amplifier. An amplitude limited output is applied to the squelch amplifier and a TTL output to flip-flop, U2, which divides the 10.7 MHz IF by two and applies a 5.35 MHz signal to a linear discriminator. The linear, discriminator consists of two tank circuits and two diode detectors, CR13, CR14, and differential amplifier, U3. One of the tank circuits is tuned above 5.35 MHz and the other tuned below 5.35 MHz. CR13 and CR14 are slope detectors. The detected dc voltage is applied to U3, which amplifies and compares the detected voltages. The squelch amplifier output is detected by CR6 and applied through U13 to the squelch switch, Q13, filter switch, U14, Q14, and the output switch, Q17. Another output goes to the inhibit one-shot, U12, and squelch counter, U11.

The output of the linear discriminator is applied to the threshold amplifier, U13, in the lock circuit and through the output switch, Q17, to the output circuits. In the lock circuit, the output of the threshold amplifier is applied to the squelch switch. When the squelch signal is present on the Gate of Q13, the threshold amplifier signal is passed through to the ramp generator, U13. This signal will stop the ramp generator at whatever voltage output is present when the signal is received. The output of the ramp generator is the control voltage for the local oscillator.

Output of the ramp generator is applied to the local oscillator through the filter switch. Squelch must be present on the base of Q14 at that time. The filter switch, Q14, applies a long time-constant filter to the local oscillator control line

to prevent the oscillator from responding to the audio signals developed in the discriminator. The output of the local oscillator is applied to the harmonic generator. The harmonic generator output is applied to the balanced mixer and locks with the incoming signal.

Squelch applied to the squelch counter inhibits the system from locking on the wrong sideband. If the system should lock on the wrong sideband, the squelch will cycle on and off and not allow the ramp generator to drive to the proper position. The output of the squelch counter is applied to the inhibit one-shot which will inhibit squelch for a time long enough for the ramp to move the local oscillator on to the next beat. U13-1 inhibits squelch during the ramp recycle time.

In the output circuits, with squelch present at the base of Q17, the discriminator output is applied through Q17 to a variable gain amplifier, U4. Selection of the attenuation to the input of the amplifier is made by the RANGE-kHz switches on the front panel. Output of the variable gain amplifier is applied to a 4 pole, active, low-pass filter, U5, U6, with a break-point at 10 kHz. The signal from the filter drives the scope output, output to counter, meter output, and over-deviation light.

Scope output is directly off the filter output through an isolation resistor, R128. The tone range output to the counter is through amplifier shaper U7, U15-4, and Q18. Output to the meter and overdeviation circuits is through a unity gain inverting or non-inverting amplifier, U10. Inverting or non-inverting mode is selected by the (+), (-) switch on the front panel. Output of the amplifier drives a perfect rectifier circuti, U9, which drives the deviation meter. This output is also routed through the limit set potentiometer to shaper and one-shot circuit, U15-6, 10, 15, Q26, which drives the over-deviation light.

Audio output is taken directly from the output switch, Q17, and routed through the audio level potentiometer to preamplifier, U8, and amplifier, Q20, Q21, Q22, Q23, which drives the speaker.

4.3.7 Battery Options

Three options for battery operation. Option 05 is used for external battery operation and when a high stability oscillator is installed. Option 06 provides for internal batteries with a battery charger. Option 07 is similar to option 05 in that both are provided for external battery operation, the only difference between the two assemblies is Option 07 does not include an oscillator inverter assembly. The inverter assemblies in each option are identical and are described once. The oscillator inverter assembly and battery charger are also described.

4.3.8 Inverter Assembly, Schematic #7-055486, 7-055462, and 7-055485

The inverter operates from battery power, external or internal, to generate +5V, and ±18V. Battery voltage is applied to pin 3 of the inverter. Transistor Q6 develops the +5V supply which is regulated by Q4, Q5, and U2. Transistor Q1 and its associated circuitry provides +6V to inverter U1 of the battery supply voltage is 12 volts, the voltage is dropped to 6 volts. When 6-volts internal batteries are installed, the same circuits merely apply the voltage to the inverter.

4.3.9 Oscillator Inverter, Schematic #7-055486

The oscillator inverter generates +24V for the high stability oscillator supply. Battery voltage is multiplied and regulated to provide a stable output voltage.

4.3.10 Charger Assembly, Schematic #7-055462

The charger assembly is used with internally installed batteries. Batteries are charged only when the instrument is turned off and the power cord is connected to a source of ac voltage. Charging voltage is obtained from Q4 in the counter power supply and charges the batteries at approximately a one-ampere rate until maximum voltage is sensed by differential amplifier Q3-Q4. At high-voltage (approximately 6.7 volts) the charge rate is reduced to a trickle charge rate of 100 milliamperes.

CHAPTER 5

CALIBRATION AND MAINTENANCE

5.1 INTRODUCTION

This chapter contains procedures for the calibrating and maintenance of the 6254/6255 series to aid the user in maintaining the instrument in proper operating condition. Whenever the instrument requires service, contact the nearest S-D representative to arrange field service, or factory returns if necessary. Address all inquiries on operation or application to the nearest sales/service office listed in the front of this manual. Specify both model and serial number in all correspondence.

5.2 TEST EQUIPMENT

Test equipment recommended for maintaining and checking performance is listed in Table 5.1. Equivalent test equipment, having similar performance characteristics, may be substituted when necessary.

TABLE 5.1 TEST EQUIPMENT

Type	Characteristics	Recommended Model
Signal Generator		Motorola Model S-1329A
Signal Generator		HP Model 608
Signal Generator		HP Model 612 A
Signal Generator		HP Model 651 B
Signal Generator		Wavetek Model 2001
Digital Voltmeter		SD Model 7004A
RF Power Amplifier		EIN Model 503L
RF Voltmeter		HP Model 411 A
Oscilloscope		Tektronix Model 545
Frequency Standard	Stability <2 X 10^{11} per month	General Technology Model 304 B
Connector	BNC "T"	---

5.3 COVER REMOVAL

To remove either the top or bottom cover, remove the screws which are exposed at either side of the cover. Slide the cover to the rear and lift away from the instrument.

WARNING

Dangerous voltages are exposed when the covers are removed and the isntrument is connected to a power source. Exercise care when performing maintenance or calibration procedures.

To remove the side covers, remove the end trim at the rear of the instrument, slide the covers back and away from the instrument.

5.4 DEVIATION METER INSTALLATION

Connect the power cord to the deviation meter. Ensure the white RF cable from the counter is clear of the deviation meter and insert the deviation meter approximately three fourths the way into the chassis. Insert the RF Cable through the hole from the top of the deviation meter and connect to the meter input on the bottom of the P.C. board. Slide the deviation meter completely into the chassis. To remove the deviation meter from the chassis, reverse the above procedure.

5.5 OPERATIONAL TEST

The following procedures may be used to determine a requirement for calibration/maintenance or to check the instrument after calibration/maintenance has been performed. If the instrument does not meet or exceed the specifications listed in Chapter 1 of this manual, the need for calibration or maintenance may be indicated. Prior to performing calibration or maintenance, check the oscillator calibration, fuses, and power source.

5.5.1 Counter Functional Test

This test is applicable to all models of the counter used in the Counter/Deviation Meter.

1. Connect the instrument to the appropriate power source.
2. Set the counter controls:

1 MHz Int/Ext	Int
Resolution .001 Hz	Press
Frequency Band 50 Hz-3 kHz	Press
Sensitivity	Max
Power	Press

3. Connect signal generator, Model 651, to the 20 Hz-50 MHz input connector.
4. Adjust the signal generator for a frequency of 50 Hz, dial accuracy, and an amplitude of 25 mV rms.
5. Display should indicate 50.000 Hz ±4 counts ±dial accuracy.
6. Increase signal generator output frequency to 3 kHz. Display should read 3000.000 Hz ±4 counts ±dial accuracy.
7. Press .01 Hz Resolution. Display should be 3000.00 Hz ±4 counts ±dial accuracy.

8. Press 20 Hz-50 MHz Frequency Band switch. With signal generators, Model 651 and Model 608, apply various frequencies between and including 20 Hz and 50 MHz at an amplitude of 25 mV rms.

9. Display should indicate input frequency ±1 count ±dial frequency.

10. Press 25 MHz to 512 MHz Freqeuncy Band switch. Utilizing signal generators, Model 608 and Model 612, apply various frequencies, between and including 25 MHz to 512 MHz at an amplitude of 50 mV rms, to the 25 MHz-512 MHz input connector.

11. Display should indicate input frequency ±1 count ±dial accuracy.

12. Connect test equipment as shown in Figure 5.2. Slowly increase power amplifier output signal amplitude until overload light flashes. Reduce signal amplitude. Instrument should indicate input frequency.

13. Adjust signal generator to a frequency of 512 MHz and record reading on dispaly. Connect 1 MHz freqeuncy standard to 1 MHz connector on rear panel. Position Int/Ext switch to Ext.

14. Display should show less than 51 counts difference.

15. Press 1 Hz resolution switch, momentarily press Reset switch. Off Scale indication should light at end of gate.

5.5.2 6255 Deviation Meter Functional Test

To perform these tests, the deviation meter must be installed in a functional counter. See Section 5.4.

1. Connect the instrument to an appropriate power supply.

2. Position the instrument controls.

COUNTER	
Int/Ext (rear panel)	Int
Power	Press
25 MHz-512 MHz	Press
10 Hz	Press
Sensitivity	Max
DEVIATION METER	
Audio Level	CCW
Deviation	- (Neg)
Range-kHz	Press 2

3. With a signal generator connected to the 25-512 MHz input connector, apply various frequencies between 25 MHz and 512 MHz at an amplitude of -13 dBm.

4. Observe Lock indicator. Indicator should light within four seconds after signal is applied.

5. Connect signal generator S1329A to the 25-512 MHz input connector. Adjust to a frequency output of 512 MHz at an amplitude of -13 dBm with zero modulation deviation. Lock indicator should light and deviation should be 150 Hz or less. (NOTE: Generator FM noise should be taken into account).

6. Connect signal generator Model 651 to external modulation connector on signal generator S1329A. Adjust S1329A to 30 MHz output at an amplitude of -13 dBm.

7. Press Range-kHz switch 6.

8. Adjust modulation frequency to various frequencies between 50 Hz and 8 kHz at a modulation deviation of 1.5 kHz. Press Count tone switch and verify correct readout on counter display.

9. Adjust signal generator to 30 MHz at -13 dBm. Adjust modulation frequency to 1 kHz with 5 kHz modulation deviation.

10. Adjust Limit Set so that Peak FM Deviation indicator lights.

11. Vary modulation frequency between 50 Hz and 8 kHz and verify Peak FM Deviation indicator lights at 5 kHz ±180 Hz modulation deviation and goes off below 5 kHz.

12. Connect signal generator S1329A, power amplifier, EIN503L, and RF Voltmeter, HP411A, as shown:

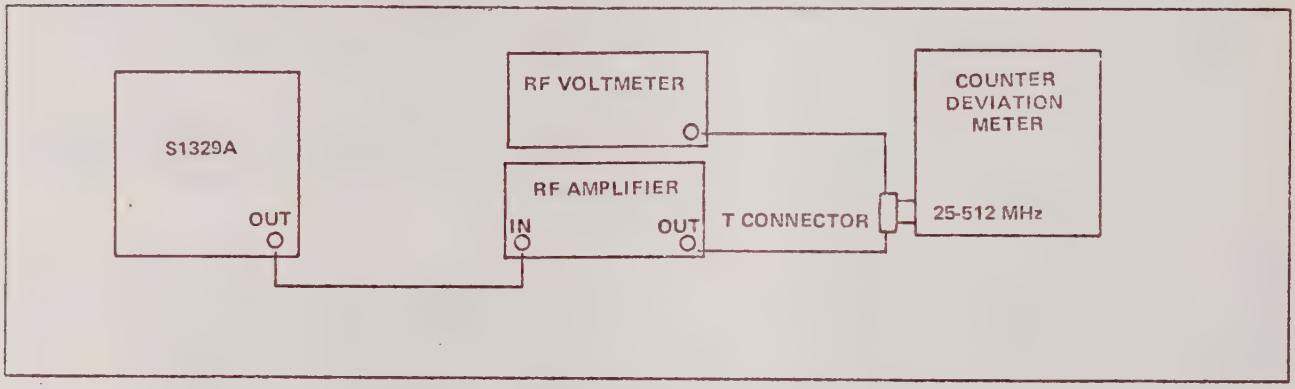


FIGURE 5.1 DEVIATION TEST CONNECTIONS

13. Press Range-kHz 6 switch.

14. For the following tests use various frequencies between 25 MHz and 512 MHz for each step. Vary the signal amplitude from -13 dBm to +27 dBm at the counter input.

15. With the signal at 5 kHz deviation, 1 MHz modulation frequency, verify Deviation Meter reading of 5 kHz ±180 Hz.

16. Change the modulation frequency to 8 kHz. Verify Deviation meter reading of 5 kHz ±180 Hz.

17. Change the modulation frequency to 50 Hz. Verify Deviation meter reading of 5 kHz ±180 Hz.

18. Change the modulation deviation to 2 kHz. Verify Deviation meter reading.

19. Press the Range-kHz 2 switch. Verify the Deviation meter is reading 2 kHz ±60 Hz.

20. Change the modulation frequency to 3 kHz. Verify the Deviation meter is reading 2 kHz ±60 Hz.

21. Press Range-kHz 20 switch. Adjust modulation deviation to 15 kHz. Verify a Deviation meter reading of 15 kHz ±600 Hz.

22. Change +/- polarity switch. Verify that the Deviation meter reading changes less than ±200 Hz.

23. Connect the oscilloscope (Tektronix 581) to the Scope Out connector on the front panel. Record the peak-to-peak voltage of the 3 kHz sine wave.

24. Press the Range-kHz 100 switch. Record the peak-to-peak voltage of the 3 kHz sine wave. Verify that it is 20% of the reading in step 23, ±3%.

25. Disconnect the signal generator, RF amplifier, and RF voltmeter.

26. Connect signal generator, Wavetek 2001, to the 25-512 MHz connector. Modulate the signal with the HP 651.

27. Utilize various frequencies from 25 MHz to 512 MHz at an amplitude of -13 dBm. Modulate the signal with a frequency of 1 kHz and a modulation deviation of 100 kHz.

28. Verify correct operation of the instrument.

29. Repeat steps 27 and 28 using a modulation frequency of 50 Hz.

30. Repeat steps 27 and 28 using a modulation frequency of 8 kHz.

31. Connect signal generator S-1329A to the 25-512 MHz input connector. Modulate the signal with HP 651.

32. Adjust the signal generator for various output frequencies from 25 MHz to 512 MHz at -13 dBm amplitude. Change modulation frequency from 300 Hz to 8 kHz at a modulation deviation of 500 Hz to 6 kHz. Verify operation of the Audio Level control and speaker.

5.6 CALIBRATION

The time base oscillator is the only assembly which requires periodic calibration. The maximum interval between calibration periods depends upon the degree of accuracy required by the user, see Section 3.4 and Table 1.1.

5.6.1 Standard Oscillator and TCXO Calibration

1. Set the instrument controls:

Resolution	1 Hz
Frequency Band	20 Hz-50 MHz

2. Connect the 1 MHz frequency standard to the 20 Hz-50 MHz input connector.

3. Adjust the Osc Adj on the rear panel for a reading of 1000000 Hz ±1 count.

5.6.2 High Stability Oscillator

1. Ensure that the instrument has been on and operating for 72 hours prior to calibration.

2. Connect the 1 MHz frequency standard to the external Sync of the oscilloscope.

3. Connect the 1 MHz BNC Connector on the rear panel to the vertical input of the oscilloscope. Set oscilloscope for 10 ns per division.

4. Adjust the oscillator, as required, to produce a stable waveform. If the waveform moves at a rate of one division per second, the frequencies are within ±1 part in 10^8 of each other. A rate of on division per 10 second period indicates that the two frequencies are within ±1 part in 10^9 of each other.

5.7 CIRCUIT ADJUSTMENT

Circuit adjustments should not be made unless a trouble has been found which definitely indicates a need for such adjustment.

5.7.1 Power Supply

There are no voltage adjustments on the power supply, however, the checks must be made in order to assure proper voltages for instrument operation.

1. Disconnect power cord from AC power.
2. Remove top cover, input amplifier assembly, and prescaler assembly.
3. With the digital voltmeter, check the ac input connector to ensure isolation from ground.
4. Check the +5V, A4 pins 9 and K to ensure isolation from ground.
5. Check the -12V, A4 pins 8 and J to ensure isolation from ground.
6. Connect the power cord to the proper line voltage and press the Power switch.
7. Check the +5V bus for +5V ±0.2 Vdc. Check the -12V bus for -12V ±0.5 Vdc.
8. Turn power off.

5.7.2 Amplifier Assembly, A3

5.7.3 Prescaler Assembly, A4.

1. Turn power off.
2. Check +5V bus and -12V bus for isolation from ground.

3. Set the counter controls:

Resolution 10 Hz	Press
25 MHz-512 MHz	Press

4. Connect the 450 MHz to 1200 MHz signal generator to the 25-512 MHz input connector.

5. Adjust the signal generator output to 512 MHz, ±dial accuracy, at an amplitude of -13 dBm.

6. Adjust the METER ZERO potentiometer, R11, so the Input Level meter pointer rests on the dividing line between the green and lower red siection of the meter.

7. Connect the signal generator, HP 608, the RF power amplifier, and the RF voltmeter to the 25-512 MHz BNC connector as shown below:

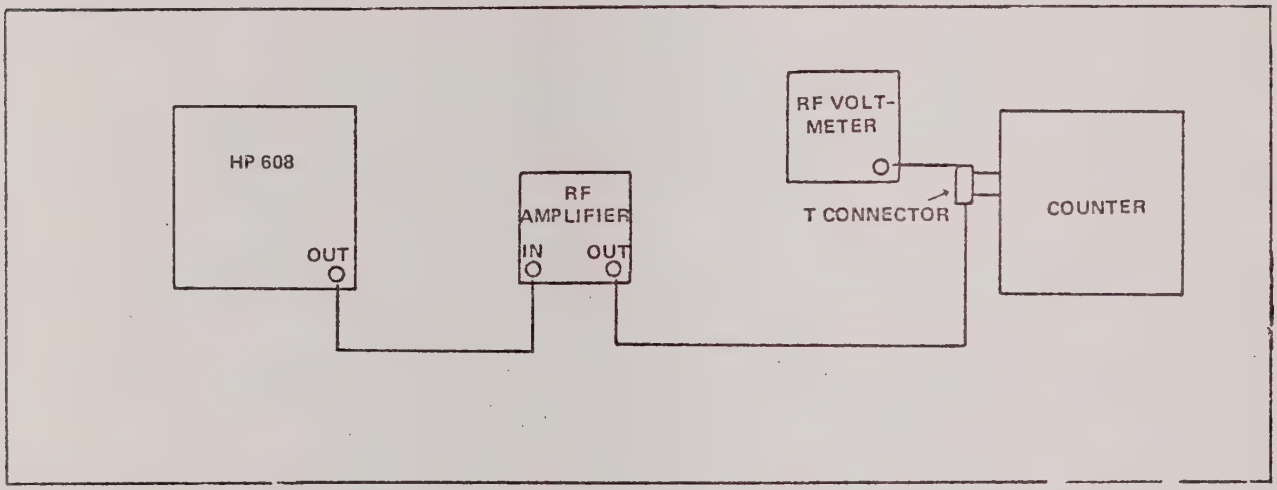


FIGURE 5.2 OVERLOAD SET TEST CONNECTIONS

8. Adjust the signal generator for a frequency output of 50 MHz. Adjust the RF amplifier for a signal amplitude of 5V rms on the RF voltmeter.

9. Adjust the OVERLOAD SET potentiometer, R51, so the Overload indicator flashes and the counter goes to the reset condition.

5.7.4 Deviation Meter.

1. Remove the bottom cover.

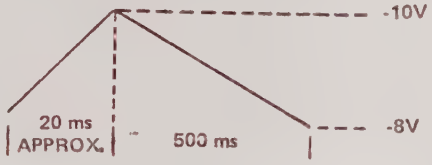
2. With the digital voltmeter, check power input terminals (lugs) 2, 3, 4, 5, and 6 for isolation from ground and isolation between terminals.

3. Press Power switch. Make the following checks:

TERMINAL	TO	RESULT
2	Gnd	+5V ±0.2 Vdc
*6	Gnd	+12.25V ±0.05 Vdc
5	Gnd	-12.25V ±0.2 Vdc
TP15	Gnd	10.5V to 11.5 Vdc
Q4 Drain	Gnd	11V to 12 Vdc

*Adjust +12V ADJ, R190, to obtain proper voltage at terminal 6.

4. With the oscilloscope, monitor TP10. Adjust R95 for a bottom ramp voltage of -8 Vdc.



5. With no signal applied, measure and record the voltage at TP1.

6. Connect signal generator, HP608, to the 25-512 MHz input connector.

7. Adjust the signal generator for an output frequency of 50 MHz at an amplitude of zero dBm. Adjust R193 so the voltage at TP1 increases 10 mV.

8. Connect the signal generator, RF amplifier, and RF voltmeter to the counter as shown in Figure 5.2. Adjust the signal generator for an output frequency of 50 MHz. Adjust the RF amplifier for an amplitude of 5V rms.

9. With the digital voltmeter monitor TP2. Adjust AGC HIGH potentiometer, R7, for the zero signal voltage at TP1 +5 mV. Change the value of R2 if required.

10. Connect a jumper from TP11 to terminal 5, -12V.

11. Install a 100 kΩ isolation resistor on the probe of the digital voltmeter and check the voltage at the source of Q4. The voltage should be 1.5V ±0.3 Vdc. If this voltage is incorrect, change Q4.

12. Adjust the signal generator for a frequency output of 15.9 MHz at an amplitude of zero dBm.

13. With the oscilloscope, monitor TP3, adjust L19 for a zero beat. (Secure core with Q-Dope.)

14. With the isolation probe, step 12, measure the voltage at the anode of CR9, adjust C54 for maximum negative voltage. The voltage measurement should be between -0.15V and 0.50V.

15. With the isolation probe, measure the voltage at the cathode of CR10. Voltage should be between +0.15V and +0.50V.

16. Install the IF shield can.

17. Adjust the signal generator for the IF center frequency (see table below) at an amplitude of zero dBm.

TABLE 5.2 FILTER COLOR CODING

Production sorting delivers five groupings of center frequencies within ±100 kHz of nominal 10.7 MHz, each with tolerance of ±25 kHz. Each is color coded for identification.					
C_f (±25 MHz)	10.625 MHz	10.6625 MHz	10.700 MHz	10.7375 MHz	10.775 MHz
Color	Orange	Yellow	Green	Blue	Violet

18. Monitor TP9, reduce signal amplitude while adjusting C15 and C42 to obtain a negative voltage peak.

19. Adjust the signal generator for the IF center frequency at zero dBm. Measure and record the voltage at TP9.

20. Remove the input signal. Measure voltage at TP16. Adjust R33 for a voltage measurement of 90% of the voltage measurement at TP9.

21. Measure the voltage at TP8. Measurement should be approximately -11V with no signal present.

22. Adjust the signal generator for the IF center frequency at zero dBm. Measure the voltage at TP8. Measurement should be approximately +11V.

23. With the signal generator, HP608, apply frequency of 9.9 MHz at an amplitude of 5 dBm to TP5, using an X1 scope probe.

24. Measure the voltage at TP7 and adjust C47 for a peak.

25. Adjust the freqeuncy to 11.5 MHz at an amplitude of 5 dBm. Measure the voltage at TP6 and adjust C52 for a peak.

26. Remove the jumper between TP11 and -12V. Place a jumepr from TP9 to ground.

27. Connect the oscilloscope external trigger to TP12, adjust for AC, -, 5 ms/div. Connect the oscilloscope vertieal input to TP13, adjust for DC, 1V/div.

28. Connect the signal generator to the 25-512 MHz input connector. Adjust for a frequency of 36 MHz at an amplitude of zero dBm. Adjust frequency until the discriminator output is seen on the oscilloscope.

29. Adjust R69 for the best symmetrical and linear output.

30. Remove jumpers between TP9 and ground.

31. Remove the input frequency. Measure and record the voltage at TP13.

32. Adjust the signal generator for an output frequency of 30 MHz at an amplitude of zero dBm. Measure the voltage at TP8 and adjust R115 until lock occurs, TP8 goes positive.

33. Measure the voltage at TP13 and adjust R115 for zero signal voltage at TP13 (recorded in 31, above).

34. Adjust R45 fully counterclockwise.

35. Connect a signal generator to the 25-512 MHz input connector and adjust to a frequency of 300 MHz at an amplitude of -16 dBm.

36. Monitor the voltage at TP8 with the digital voltmeter. Adjust R45 slowly clockwise until lock occurs, TP8 positive.

37. Check sensitivity at various frequencies between 25 MHz and 512 MHz at an amplitude of -16 dBm to -23 dBm. Re-adjust R45 if necessary.

38. Adjust signal generator to 24 MHz at 0 dBm.

39. Connect digital voltmeter to TP8.

40. Slowly increase signal generator frequency until lock occurs (TP8 positive).

41. Adjust R95 until lock occurs between 24.3 MHz and 24.7 MHz when repeating frequency change.

42. Using one signal generator for an RF signal modulated by a second signal generator at 1 kHz, apply 30 MHz signal with 1 kHz deviation to input.

43. Adjust input signal level to -12 dBm.

44. Press Range-kHz 6 pushbutton.

45. Adjust R147 until meter indicates 1 kHz.

46. Rotate Limit Set control fully ccw.

47. Rotate R126 ccw until Peak FM Deviation indicator lights, then rotate R126 cw until light goes off.

48. Connect oscilloscope to TP17 or U5-4.

49. Change deviation to 3 kHz.

50. Adjust R162 for best signal presentation while decreasing deviation. Signal should be free from extraneous signals at 1.4 kHz.

51. If necessary, adjust R156 to increase sensitivity.

52. Change to 5 kHz at 1 kHz modulation frequency.

53. Note meter reading, then change modulation frequency to 9 kHz.

54. Adjust modulation frequency between 8 kHz and 50 Hz and verify the meter reading is flat within ±120 Hz.

55. Change deviation to 15. kHz and press Range-kHz to 2 kHz.

56. Adjust modualtion freuqency from 50 Hz to 8 kHz and verify that meter reading is flat within ±40 Hz to 3 kHz and rolls off above 3 kHz.

57. Adjust C96, as necessary, to obtain indications given in step 56.

58. Apply 300 MHz signal to input. Modulate signal generator externally with 1 kHz using a second signal generator.

59. Connect oscilloscope DC input to TP9 and adjust R115 for most negative display while increasing deviation to 110 kHz.

60. Disconnect test equipment.

61. Adjust Deviaiton meter mechanical zero.

62. Calibrate signal generator for 5 kHz deviation at 1 kHz modulation frequency at any RF frequency below 175 MHz (Bessel null technique).

NOTE

Any calibrated FM signal generator accurate to within ±0.5% at 5 kHz deviation may be used.

63. Apply signal to input at -12 dBm to 0 dBm level.

64. Press Resolution-kHz 6 pushbutton and adjust R147 for a meter reading of 5 kHz.

5.8 ROUTINE MAINTENANCE

A regular program for maintenance and inspection every five to six months is recommended for this unit. As part of these regular procedures, the instrument should be checked in the following manner:

1. Disconnect ac power and remove the covers.

2. Make a thorough visual inspection of all wiring and cables. Check for frayed, loose, or burned wires.

3. Check the physical integrity of all components. Look for burned or cracked components, loose solder connections, leakage of insulation compounds, and general physical damage. When a printed-circuit board contains integrated-circuit packages, ensure that all packages are firmly mounted. Never unnecessarily remove and replace a package.

4. Check all front panel switches and controls for loose or broken terminals, loose or sticking shafts, etc.

5. If the internal panel surfaces and components have an excessive amount of dust deposited on them, use a soft brush and low-pressure stream of air to remove the foreign material.

CAUTION

Do not clean P.C. boards or small internal components with a stiff brush or solvents, since damage to the circuits may result. A high-powered vaccum cleaner device should not be used on small internal components.

6. Wipe the external surfaces of the instrument with a soft, damp cloth to remove dirt, fingerprints, and other foreign materials.

7. Replace the covers and reconnect ac power. Check instrument performance in accordance with procedures given in Section 4.4. If performance does not match or exceed the specifications listed in Chapter 1 of this manual, corrective maintenance may be required.

5.9 PRINTED-CIRCUIT BOARD REPAIR

When replacing integrated circuits or other electronic components soldered to printed circuit boards, the procedures indicated below must be followed or damage to the board may result:

1. Determine by troubleshooting techniques, which integrated circuit or discrete component(s) has failed.

2. Remove the defective component(s) from the board by cutting the pins or leads with a small diagonal clipping tool. (Always remove and replace the entire component.)

3. Apply heat (40-50 W soldering iron) sparingly to each of the cut pins or leads and remove from the board; clean the hole(s) with a toothpick or solder suction tool.

4. Form the tinned leads of the replacement part and insert in the printed-circuit holes; solder, then trim leads to extend 1/16-inch beyond the back surface of the board. (Use only 63-37 solder with maximum 1/16-inch diameter.)

CAUTION

Always trim semiconductor leads only after soldered installation is complete. This procedure greatly lessens the possibility of component failure due to shock-wave damage caused by the trimming tool.

5. When soldering semiconductor devices and all small components, be sure to use a heat sink tool or long-nosed plier connected to the component lead(s) while each is being soldered. Allow the soldered connection to cool before removing the heat sink.

6. Clean all dirt and solder-flux from the printed-circuit traces by liberal application of isopropyl alcohol or freon-type solvents.

CHAPTER 6
REPLACEABLE PARTS LIST

6.1 INTRODUCTION

This chapter contains replaceable parts lists for each of the assemblies in the Models 6254/6255 Frequency Counter/Deviation Meter.

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION FINAL ASSEMBLY MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
7	PANEL, Decorative	055687	1
9	PANEL, Sub, Blank Plug-in	053690	1
10	PANEL, Blank Plug-in Decorative	053691	1
12	COVER, Side	053795	2
13	COVER, Bottom	053794	1
14	COVER, Top	053793	1
16	COVER, Front Assembly	055037	1
18	WINDOW	04559361	1
20	TRIM, Front	03723061	2
21	TRIM, Side	03985903	4
22	TRIM, End	03903402	3
24	HANDLE	100891	1
25	COVER, Mtg. Brkt	039857	8
26	CORD, Line	102408	1
27	NUT, Tinnerman 6-32	100959	16
28	SCREW, 8-32 X 1/2 FHMS	10074308	8
29	SCREW, 8-32 X 5/16 PHMS	10063205	16
30	SCREW, 6-32 X 1/4 FHMS	10073105	4
31	SCREW, 6-32 X 5/16 FHMS	10073105	8
33	FEET, Set	101059	1
34	BAIL, Short	101057	1
35	NUT, Float 4-40	102903	6
36	SCREW, 6-32 X 1/2 PHMS	10063208	6
38	KNOB	102764	1
39	NUT, Speed 6-32 (for item 20)	102944	4
41	TRIM, End Modified	055035	1
42	TRIM, End Modified	03903402	1
44	SCREW, 4-40 X 1/4 PHM	10062604	6
45	WASHER, #4 Split	100711	4
47	SCREW, 6-32 X 3/8 PHM	10063206	2
48	SCREW, 4-40 X 7/16 PHM	10062607	2
49	NUT, Kep 4-40	100941	2
52	LOCTITE, 252 (for item 2)	103094	A/R

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION UNIVERSAL CHASSIS ASSEMBLY #055069 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
A1	LOGIC P.C. Assembly	D05377001	1
A2	READOUT P.C. Assembly	B05528201	1
A3	AMPLIFIER Assembly	B05589101	1
A4	PRESCALER P.C. Assembly	B05349901	1
A5	OSCILLATOR P.C. Assembly	B05318301	1
C43	CAPACITOR, 1 µF 25V Disc	100176	2
C44	Same as C43		
Q1	TRANSISTOR, 2N5190	101394	2
Q3	Same as Q1		
U2	INTEGRATED CIRCUIT, MC7912CP	103156	1
	REAR PANEL, Assembly	C05368601	1
	FRONT Sub-Panel	C053685	1
	RAIL, Left Side	B055327	1
	RAIL, Right Side	B053115	1
	SCREW, 6-32 x 3/8 PHM	10063206	10
	SCREW, 4-40 x 5/16 PHM	10062605	4
	WASHER, #6 Splitlock	100712	11
	WASHER, #6 Flat	100704	10
	WASHER, #4 Splitlock	100711	20
	WASHER, #4 Flat	100703	1
	SCREW, 4-40 x 1/4 PHM	10062604	20
	NUT, #6-32	100638	8
	NUT, Tinnerman	101123	2
	ALLEN WRENCH	102824	1
	WIRE LIST, Loose	A055068	1
	RAIL, Bottom	B053694	2
	NUT, #4-40 kep	100633	1
	BRACKET, Right Angle	100849	1
	SCREW, #4-40 x 3/8 PHM	10062606	3
	SCREW, #6-32 x 1/4 PHM	10063204	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION FRONT COVER ASSEMBLY #055037 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
	HINGE, Take Apart (Excelsior #838 1/4N	102813	2 pr.
	SCREW, 4-40 X 5/16 FHM	10072005	2
	WASHER, #4 Splitlock	100711	6
	SCREW, 4-40 X 5/16 PHM	10062605	6
	WASHER, #4 Flat	100703	2
	NUT, 4-40 Kep	100941	
	COVER, Door Latch (Nylatch Assembly)	100983	1
	LATCH, Modified	A039099	
	BRACKET, Angle	B039785	1
	COVER, Hinge	B039786	1
	COVER, Stop	B039411	2
	COVER, Door	C055039	1
	COVER, Front Modified	C055038	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION REAR PANEL ASSEMBLY MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
F1	FUSE, 1/2A 3AG 250V	100595	1
J1	AC Receptacle	101288	1
J2	CONNECTOR, BNC	101155	1
S2	SWITCH, Slide 4 PDT 115-230	102329	1
S3	SWTICH, Slide DPDT	102328	1
T1	TRANSFORMER, Power	B053191	1
U1	REGULATOR, +5V LM309K	025787	1
XF1	FUSE, Post	102409	1
	SCREW, 4-40 X 5/16 PHM	10062605	4
	SCREW, 6-32 X 1-1/2 PHM	10063224	4
	NUT, 4-40 Small	100622	2
	SCREW, 4-40 X 1/4 PHM	10062604	6
	NUT, 6-32 Kep	100862	10
	SCREW, 6-32 X 3/8 PHM	10063206	6
	NUT, 4-40 Kep	100941	6
	WASHER, #4 Splitlock	100711	2
	WASHER, #4 Flat	100703	2
	SCREW, 4-40 X 3/8 PHM	10062606	2
	GND. Lug, BNC	100495	1
	LUG, Solder #6	100490	1
	COVER, Plate	A03112411	1
	COVER, Plate	02139811	1
	SCREEN, Speaker	A053695	1
	PANEL, Rear	0053686	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1, LOGIC P.C. ASSEMBLY D05377001 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, .005 µF dual	102615	2
C2	Same as C1		
C3	CAPACITOR, 2500 µF, 15V Ax El	100247	2
C4	Same as C3		
C5	CAPACITOR, 1 µF, 35V Tant	100082	2
C6	Same as C5		
C7	CAPACITOR, 250 µF, 25V Ax El	102614	2
C8	CAPACITOR, 1000 µF, 16V Ax El	103148	1
C9	CAPACITOR, .01 µF, 100V Disc	100103	1
C10	CAPACITOR, 56 µF, 6V Tant	100225	2
C11	CAPACITOR, 150 pF, 500V DM	10021901	1
C12	CAPACITOR, 180 pF, 500V DM	10023701	1
C13	CAPACITOR, 4.7 µF, 10V Tant	100205	1
C14	CAPACITOR, 15 pF, 500V DM	10024101	1
C15	CAPACITOR, 10 pF, 500V DM	10025301	2
C16	Same as C15		
C17	CAPACITOR, 15 µF, 20V Tant	100211	4
C18	CAPACITOR, 4.7 µF, 35V Tant	100071	2
C19	CAPACITOR, .1 µF, 50V Disc	100178	3
C20	Same as C17		
C21	Same as C19		
C22	Same as C19		
C23	CAPACITOR, .001 µF, 1 kV Disc	100076	1
C24	CAPACITOR, 2.2 µF 35V Tant	100100	1
C25	CAPACITOR, .05 µF, 10V Disc	100122	4
C26	Same as C17		
C27	Same as C17		
C28	CAPACITOR, 1 µF, 25V Disc	100226	6
C29	Same as C28		
C30	Same as C25		
C31	Same as C25		
C32	CAPACITOR, 47 µF, 20V Tant	100186	2
C33	Same as C28		
C34	Same as C32		
C35	Same as C28		
C36	Same as C28		
C37	Same as C18		
C38	CAPACITOR, 47 pF, 500V DM	10017101	1
C39	Same as C7		
C40	CAPACITOR, .033 µF, 25V Disc	100333	1
C41	Same as C10		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1, LOGIC P.C. ASSEMBLY D05377001 Contd MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C42	CAPACITOR, 100 µF, 10V Tant	100119	1
C43	CAPACITOR, P/O Universal Chassis Assembly		Ref
C44	CAPACITOR, P/O Universal Chassis Assembly		Ref
C45	Same as C25		
C46	Same as C28		
CR1	DIODE, 1N4005	100413	7
CR2	Same as CR1		
CR3	Same as CR1		
CR4	Same as CR1		
CR5	DIODE, 30S05	103252	2
CR6	Same as CR5		
CR7	DIODE, VSK320	103344	2
CR8	Same as CR7		
CR9	Same as CR1		
CR10	DIODE, 1N4151	100385	3
CR11	Same as CR10		
CR12	Same as CR10		
CR13	Same as CR1		
CR14	Same as CR1		
L1	INDUCTOR, Line Filter	101328	2
L2	Same as L1		
L3	INDUCTOR, Core w/2T 28 GA		1
Q1	TRANSISTOR, P/O Universal Chassis Assembly	101421	Ref
Q2	Not Used		
Q3	TRANSISTOR, P/O Universal Chassis Assembly		Ref
Q4	TRANSISTOR, P/O Universal Chassis Assembly		Ref
Q5	TRANSISTOR, 2N4275	102716	3
Q6	TRANSISTOR, MPS6521	101430	1
Q7	TRANSISTOR, 2N4258	102675	2
Q8	Same as Q5		
Q9	TRANSISTOR, MPSA12	101396	1
Q10	Same as Q7		
Q11	TRANSISTOR, 2N3646	101369	1
R1	RESISTOR, 22K, 1/4W, 5%	101572	9
R2	RESISTOR, 270Ω, 1/2W, 5%	101485	1
R3	Same as R1		
R4	Not Used		
R5	RESISTOR, 1Ω, 2W, 5%	102214	1
R6	RESISTOR, 22Ω, 1/4W, 5%	101696	1
R7	RESISTOR, 3.3k, 1/4W, 5%	101559	3
R8	RESISTOR, 2.2k, 1/4W, 5%	101562	3
R9	Not Used		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1, LOGIC P.C. ASSEMBLY D05377001 Contd MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R10	Not Used		
R11	RESISTOR, 1k, 1/4W, 5%	101569	3
R12	RESISTOR, 4.7k, 1/4W, 5%	101498	1
R13	RESISTOR, 470Ω, 1/4W, 5%	101625	3
R14	RESISTOR, 10k, 1/4W, 5%	101570	5
R15	Same as R7		
R16	Same as R13		
R17	Same as R14		
R18	RESISTOR, 3.9k, 1/4W, 5%	101601	1
R19	RESISTOR, 220Ω, 1/4W, 5%	101566	1
R20	RESISTOR, 1.2k, 1/4W, 5%	101581	1
R21	Same as R8		
R22	Same as R8		
R23	Same as R14		
R24	Same as R11		
R25	Same as R7		
R26	Same as R1		
R27	Same as R1		
R28	Same as R1		
R29	RESISTOR, 47k, 1/4W, 5%	101574	1
R30	RESISTOR, 27k, 1/4W, 5%	101578	2
R31	Same as R30		
R32	Same as R14		
R33	Same as R1		
R34	Same as R1		
R35	Same as R1		
R36	Same as R13		
R37	Same as R11		
R38	RESISTOR, 4.3k, 1/4W, 5%	101546	1
R39	Same as R1		
R40	RESISTOR, 8.2k, 1/4W, 5%	101595	1
R41	Same as R1		
S1	SWITCH, Pushbutton 7 position	055064	1
U1	INTEGRATED CIRCUIT, P/O Rear Panel Assembly		Ref
U2	INTEGRATED CIRCUIT, P/O Universal Chassis Assy		Ref
U3	INTEGRATED CIRCUIT, SN7490N	025732	5
U4	Same as U3		
U5	INTEGRATED CIRCUIT, SN7400N	025732	1
U6	INTEGRATED CIRCUIT, SN7451N	025707	1
U7	INTEGRATED CIRCUIT, MC4044P	045238	1
U8	INTEGRATED CIRCUIT, SN74123N	045209	5
U9	INTEGRATED CIRCUIT, SN4747N	025241	3

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1, LOGIC P.C. ASSEMBLY D05377001 Contd MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
U10	Same as U5		
U11	Same as U3		
U12	Same as U3		
U13	Same as U3		
U14	Same as U8		
U15	Same as U8		
U16	Same as U8		
U17	INTEGRATED CIRCUIT, MC3002P	025739	2
U18	INTEGRATED CIRCUIT, MC3001P	025740	2
U18	Same as U18		
U20	Same as U9		
U21	Same as U5		
U22	INTEGRATED CIRCUIT, SN74S64N	045222	1
U23	INTEGRATED CIRCUIT, SN475S132N	045271	1
U24	INTEGRATED CIRCUIT, SN4726N	045252	2
U25	Same as U8		
U26	Same as U24		
U27	Same as U5		
U28	Same as U18		
U29	INTEGRATED CIRCUIT, CM3003P	024767	1
U30	Same as U17		
U31	INTEGRATED CIRCUIT, MK5009	045214	1
U32	INTEGRATED CIRCUIT, SN47S112N	025786	1
U33	INTEGRATED CIRCUIT, SN47196N	025784	1
U34	INTEGRATED CIRCUIT, SN7442N	025749	1
U35	INTEGRATED CIRCUIT, N8281A	025727	1
U36	INTEGRATED CIRCUIT, NE555V	045208	1
U37	INTEGRATED CIRCUIT, A055178	055178	7
U38	Same as U37		
U39	Same as U37		
U40	Same as U37		
U41	Same as U37		
U42	INTEGRATED CIRCUIT, DM85L51N	045210	1
U43	Same as U37		
U44	Same as U37		
U45	Same as U5		
U46	Same as U8		
VR1	DIODE, Zener 1N4734	100421	1
XA2, XA3	CONNECTOR, PC 10 Pin	1101165	2
	SOCKET, Integrated Circuit 16 Pin	103350	7
	SWAGE, Terminal	100482	37
	SWAGE, Terminal	100508	20
	SWAGE, Standoff 6-32 x 1/8	100478	4

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A2, READOUT P.C. ASSEMBLY 8-DIGIT 055282 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, 56 µF, 6V Tant	100225	1
CR1	DIODE, LED 5082-4480	100460	4
CR2	Same as CR1		
CR3	DIODE, LED 5082-4484	103290	1
CR4	Same as CR1		
CR5	Same as CR1		
DS1	DISPLAY, LED, .3	103315	8
DS2	Same as DS1		
DS3	Same as DS1		
DS4	Same as DS1		
DS5	Same as DS1		
DS6	Same as DS1		
DS7	Same as DS1		
DS8	Same as DS1		
Q1	TRANSISTOR, 2N4403	103317	8
Q2	TRANSISTOR, 2N3904	101377	8
Q3	Same as Q1		
Q4	Same as Q2		
Q5	Same as Q1		
Q6	Same as Q2		
Q7	Same as Q1		
Q8	Same as Q2		
Q9	Same as Q1		
Q10	Same as Q2		
Q11	Same as Q1		
Q12	Same as Q2		
Q13	Same as Q1		
Q14	Same as Q2		
Q15	Same as Q1		
Q16	Same as Q2		
R1	RESISTOR, 27Ω 1/4W 5%	101729	14
R2	Same as R1		
R3	Same as R1		
R4	Same as R1		
R5	Same as R1		
R6	Same as R1		
R7	Same as R1		
R8	Same as R1		
R9	Same as R1		
R10	Same as R1		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A2, READOUT P.C. ASSEMBLY 8-DIGIT Contd MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R11	Same as R1		
R12	Same as R1		
R13	Same as R1		
R14	Same as R1		
R15	RESISTOR, 1k 1/4W, 5%	101569	2
R16	Same as R15		
R17	RESISTOR, 150Ω 1/4W, 5%	101615	7
R18	RESISTOR, 1.5k 1/4W, 5%	101577	8
R19	Same as R17		
R20	Same as R18		
R21	Same as R17		
R22	Same as R18		
R23	Same as R17		
R24	Same as R18		
R25	Same as R17		
R26	Same as R18		
R27	Same as R17		
R28	Same as R18		
R29	Same as R17		
R30	Same as R18		
R31	Same as R17		
R32	Same as R18		
R33	RESISTOR, 270Ω 1/4W, 5%	101542	4
R34	Same as R33		
R35	RESISTOR, 75Ω 1/4W, 5%	101737	1
R36	Same as R33		
R37	Same as R33		
U1	INTEGRATED CIRCUIT, SN74247N	103314	1
U2	INTEGRATED CIRCUIT, SN74145N	025754	1
W1	JUMPER, Molded	102879	1
	SPACER, LED	055372	2

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A3, AMPLIFIER ASSEMBLY B05589101 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, .1 µF, 500V Chip	103755	2
C2	CAPACITOR, 5 pF, 500V D Mica	100218	1
C3	Same as C1		
C4	CAPACITOR, .001 µF 1 kV Disc	100251	5
C5	CAPACITOR, 22 µF, 25V Tant	100067	4
C6	Same as C5		
C7	Same as C4		
C8	Same as C5		
C9	Same as C5		
C10	CAPACITOR, 1 µF, 25V Disc	100176	2
C11	CAPACITOR, 100 µF, 10V Tant	100119	4
C12	Same as C11		
C13	Same as C4		
C14	Same as C10		
C15	Same as C11		
C16	Same as C11		
C17	CAPACITOR, .1 µF 50V Disc	100178	1
C18	CAPACITOR, 4.7 µF 10V Tant	100205	1
C19	Same as C4		
C20	Same as C4		
C21	CAPACITOR, .05 µF 50V Disc	100134	1
CR1	DIODE, 1N4151	100385	2
CR2	Same as CR1		
J1	CONNECTOR, BNC	101170	1
L1	INDUCTOR, 1000 µH	101303	1
Q1	TRANSISTOR, MFE 121	101413	1
Q2	TRANSISTOR, 2N3640	101357	1
Q3	TRANSISTOR, 2N3646	101369	1
Q4	TRANSISTOR, 2N4275	102716	1
R1	RESISTOR, 750K 1/4W, 5%	101585	3
R2	Same as R1		
R3	Same as R1		
R4	RESISTOR, 470Ω 1/4W, 5%	101625	2
R5	Same as R4		
R6	RESISTOR, 1K 1/4W, 5%	101569	8
R7	Same as R6		
R8	RESISTOR, 22Ω 1/4W, 5%	101696	1
R9	Same as R6		
R10	Same as R6		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A3, AMPLIFIER ASSEMBLY B05589101 Contd MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R11	Same as R6		
R12	RESISTOR, 4.7k 1/4W, 5%	101589	2
R13	RESISTOR, POT, 100k 1T	101934	1
R14	Same as R12		
R15	Same as R6		
R16	Same as R6		
R17	RESISTOR, 330Ω 1/4W, 5%	101536	1
R18	RESISTOR, POT, 2M 1/4W 5%	053516	1
R19	RESISTOR, 1.5k 1/4W, 5%	101577	1
R20	RESISTOR, 220Ω 1/4W, 5%	101566	1
R21	Same as R6		
U1	INTEGRATED CIRCUIT, SN72733L	103753	2
U2	Same as U1		
U3	INTEGRATED CIRCUIT, SN74S132N	045271	1
U4	INTEGRATED CIRCUIT, LM320H-5.0	103754	1
	AMPLIFIER, Mtg. Brkt.	053117	1
	STANDOFF, 4-40 X 1/8	100492	4
	BNC, Spacer 1/8" thick	045062	1
	WELD NUT #4-4	100639	1
	SCREW, 4-40 X 1/4 PHMS	10062604	4
	WASHER, #4 Flat	100703	4
	WASHER, #4 Split	100711	4
	BNC, GND lug	107077	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A4, PRESCALER P.C. ASSEMBLY C05349901 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, .056 µF, 100V, Chip	100257	14
C2	Same as C1		
C3	Same as C1		
C4	Same as C1		
C5	Same as C1		
C6	CAPACITOR, .001 µF, 50V, C Mold	100251	6
C7	Same as C6		
C8	Same as C1		
C9	Same as C1		
C10	CAPACITOR, 16 pF, 100V, Chip	100256	3
C11	Same as C1		
C12	CAPACITOR, 47 pF, 100V, Chip	100315	2
C13	Same as C1		
C14	Same as C10		
C15	Same as C1		
C16	Same as C12		
C17	Same as C10		
C18	Same as C1		
C19	Same as C6		
C20	Same as C6		
C21	CAPACITOR, 10 pF, 100V, Chip	103185	1
C22	Same as C6		
C23	Same as C1		
C24	CAPACITOR, 1 µF, 25V, Disc	100176	1
C25	CAPACITOR, 10 µF, 20V, Tant	100063	1
C26	Same as C1		
C27	Same as C1		
C28	CAPACITOR, 47 pF, 500V, D.M.	10017101	1
C29	CAPACITOR, .1 µF, 10V, Disc	100120	2
C30	CAPACITOR, .05 µF, 10V, Disc	100122	3
C31	Same as C29		
C32	CAPACITOR, .01 µF, 100V, Disc	100103	3
C33	Same as C32		
C34	Same as C32		
C35	Same as C30		
C36	Same as C30		
C37	Same as C6		
CR1	DIODE, HP5082-2800	100442	6
CR2	Same as CR1		
CR3	Same as CR1		
CR4	Same as CR1		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A4, PRESCALER P.C. ASSEMBLY (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
CR5	Same as CR1		
CR6	DIODE, FD700	100435	2
CR7	Same as CR6		
CR8	Same as CR1		
CR9	DIODE, 1N4151	100385	2
CR10	Same as CR9		
J1	CONNECTOR, BNC, Lg. Shank	101170	1
L1	INDUCTOR, 100 µH	101320	2
L2	Same as L1		
L3	INDUCTOR, Printed on Board		REF
L4	Same as L3		
L5	Same as L3		
L6	INDUCTOR, .05 µH	101323	3
L7	Same as L6		
L8	Same as L6		
L9	Ferrite Bead	112420	1
M1	METER	053610	1
Q1	TRANSISTOR, 2N6304	103171	5
Q2	Same as Q1		
Q3	Same as Q1		
Q4	Same as Q1		
Q5	Same as Q1		
Q6	TRANSISTOR, 2N4258	102675	2
Q7	TRANSISTOR, 2N4275	102716	1
Q8	TRANSISTOR, 2N3646	101369	2
Q9	Same as Q8		
Q10	TRANSISTOR, 2N3904	101377	1
R1	RESISTOR, 33Ω 1W, 5%	101878	2
R2	RESISTOR, 22Ω 1/2W, 5%	106011	1
R3	Same as R1		
R4	RESISTOR, 51Ω 1/4W, 5%	101672	1
R5	RESISTOR, 200Ω 1W, 5%	101783	2
R6	Same as R5		
R7	RESISTOR, 120k 1/8W, 5%	101825	1
R8	RESISTOR, 560k 1/8W, 5%	102015	1
R9	RESISTOR, 3.9k 1/8W, 5%	101714	1
R10	RESISTOR, 10k 1/9W, 5%	101697	2
R11	RESISTOR, Pot 1k, Side Adj.	102129	1
R12	RESISTOR, 8.2k 1/8W, 5%	101799	2
R13	RESISTOR, 2M 1/8W, 5%	101959	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A4, PRESCALER P.C. ASSEMBLY (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R14	RESISTOR, 100k 1/8W, 5%	101976	1
R15	RESISTOR, 1k 1/8W, 5%	101711	6
R16	RESISTOR, 4.7k 1/8W, 5%	101792	1
R17	RESISTOR, 27k 1/8W, 5%	101952	1
R18	RESISTOR, 15k 1/8W, 5%	101698	1
R19	Same as R15		
R20	RESISTOR, 82Ω 1/8W, 5%	101800	3
R21	RESISTOR, 27Ω 1/8W, 5%	101810	3
R22	RESISTOR, 3k 1/8W, 5%	101913	3
R23	Same as R15		
R24	Same as R20		
R25	Same as R21		
R26	RESISTOR, 51Ω 1/8W, 5%	101815	3
R27	Same as R22		
R28	Same as R15		
R29	Same as R20		
R30	Same as R21		
R31	Same as R26		
R32	Same as R22		
R33	RESISTOR, 6.8k 1/8W, 5%	101716	1
R34	RESISTOR, Pot. 10k, Side Adj.	100026	2
R35	RESISTOR, 180Ω 1/8W, 5%	101720	2
R36	RESISTOR, 100Ω 1/8W, 5%	101701	3
R37	Same as R26		
R38	RESISTOR, 1.8k 1/8W, 5%	101712	1
R39	RESISTOR, 2.7k 1/8W, 5%	101803	1
R40	Same as R36		
R41	Same as R35		
R42	RESISTOR, 33k 1/8W, 5%	101693	1
R43	RESISTOR, 470Ω 1/8W, 5%	101709	1
R44	Same as R36		
R45	RESISTOR, 220Ω, 1/8W, 5%	101798	2
R46	Same as R12		
R47	Same as R45		
R48	RESISTOR, 56k 1/8W, 5%	101823	1
R49	Same as R10		
R50	Same as R15		
R51	Same as R34		
R52	RESISTOR, 5.6k 1/8W, 5%	101715	4
R53	Same as R52		
R54	Same as R52		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A4, PRESCALER P.C. ASSEMBLY (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R55	Same as R52		
R56	Same as R15		
R57	RESISTOR, 1M 1/8W, 5%	101695	1
U1	INTEGRATED CIRCUIT, LM4250CH	045258	1
U2	INTEGRATED CIRCUIT, LM301A	025745	1
U3	INTEGRATED CIRCUIT, SP630C	045211	1
U4	INTEGRATED CIRCUIT, NE555V	045208	1
VR1	ZENER DIODE, 1N961A	100395	1
VR2	ZENER DIODE, 1N749	100419	1
XU3	SOCKET, IC, 14 Pin	101281	14
	BRACKET, Meter Mtg.	053114	2
	BRACKET, Board Mtg.	053609	1
	SPACER, SWAGE	101060	4
	NUT, Weld, 4-40	100639	1
	SPACER, BNC 1/8" Thick	045062	1
	SCREW, 2-56 X 1/4, PHM	10062504	1
	WASHER, #2 Flat	100614	4
	WASHER, #2 Split	100661	4
	LUG, Solder BNC	100495	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A5, OSCILLATOR P.C. ASSEMBLY B05318301 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, 9-35 pF, Right Angle Adj.	100159	1
C2	CAPACITOR, 15-60 pF, Top Adj.	100234	1
C3	CAPACITOR, 150 pF, D.M.	100219	1
C4	CAPACITOR, 100 pF, D.M.	10017301	1
C5	CAPACITOR, 220 pF, D.M.	10022001	1
C6	CAPACITOR, 33 pF, D.M.	10017501	1
C7	CAPACITOR, 10 pF, D.M.	10025301	1
C8	CAPACITOR, .01 µF, 100V Disc	100103	1
C9	CAPACITOR, .05 µF, 12V Disc	100122	1
Q1	TRANSISTOR, 2N4258	102675	1
Q2	TRANSISTOR, 2N4275	102716	2
Q3	Same as Q2		
R1	RESISTOR, 47K 1/4W, 5%	101574	1
R2	RESISTOR, 100K 1/4W, 5%	101558	1
R3	RESISTOR, 4.7K 1/4W, 5%	101598	1
R4	RESISTOR, 10K 1/4W, 5%	101570	1
R5	RESISTOR, 1K 1/4W, 5%	101569	1
R6	RESISTOR, 3.3K 1/4W, 5%	101559	1
R7	RESISTOR, 470Ω 1/4W, 5%	101625	1
Y1	CRYSTAL to-5	039483	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTION 06, BATTERY PACK FINAL ASSEMBLY MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
A6	P.C. Board Assembly, Power Inverter	05317501	1
BT1	BATTERY	100042	2
BT2	Same as BT1		
Q1	TRANSISTOR, 2N5193	101405	3
Q2	Same as Q1		
Q3	Same as Q1		
	SCREW, 4-40 X 5/16, PHMS	10062605	11
	SCREW, 6-32 X 5/16, PHMS	10063205	10
	SCREW, 6-32 X 3/8, PHMS	10063206	4
	WASHER, #6 Flat	100704	14
	WASHER, #6 Splitlock	100712	14
	WASHER, #4 Flat	100703	4
	WASHER, #4 Splitlock	100411	8
	CLIP, Terminal	101064	1
	HEATSINK, Right	053188	1
	Battery Clamp Assembly, Front	04561401	1
	BATTERY CLAMP, Front	045614	1
	Battery Clamp Assembly, Rear	04561501	1
	BATTERY CLAMP, Rear	045615	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTION 07, FINAL ASSEMBLY — MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
A6	P.C. Board Assembly, Power Inverter	05317501	1
J4	BANANA JACK Min. Red	101275	1
J5	BANANA JACK Min. Black	101276	1
Q1	TRANSISTOR, 2N5193	101405	3
Q2	Same as Q1		
Q3	Same as Q1		
	SCREW, 6-32 PHM	10063205	6
	SCREW, 4-40 X 5/16 PHM	10062605	3
	SCREW, 6-32 X 3/8 PHMS	10063206	2
	WASHER, #6 Splitlock	100712	6
	WASHER, #6 Flat	100704	6
	HEATSINK, Right	053188	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A6, POWER INVERTER P.C. ASSY 05317501 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, 150 µF, 15V	100209	1
C2	CAPACITOR, .05 µf	100122	1
C3	CAPACITOR, 4.7 µF, 10V	100205	1
C4	CAPACITOR, 1 µF, 25V	100176	3
C5	CAPACITOR, .1 µF, 10V, Disc	100120	1
C6	Same as C4		
C7	Same as C4		
CR1	DIODE, 1N4005	100413	3
CR2	DIODE, 1N4151	100385	5
CR3	Same as CR1		
CR4	Same as CR2		
CR5	Same as CR2		
CR6	Same as CR1		
CR7	Same as CR2		
CR8	SAme as CR2		
Q1	Part of Final Assembly		3
Q2	Same as Q1		
Q3	Same as Q1		
Q4	TRANSISTOR, 2N3646	101369	4
Q5	Same as Q4		
Q6	Same as Q4		
Q7	Same as Q4		
Q8	TRANSISTOR, 2N3638	101360	1
Q9	TRANSISTOR, 2N3904	101377	2
Q10	Same as Q9		
R1	RESISTOR, 39Ω 1/4W, 5%	101733	1
R2	RESISTOR, 390Ω 1/4W, 5%	101592	4
R3	RESISTOR, 120Ω 1/4W, 5%	101717	1
R4	RESISTOR, 1Ω 2W, 5% WW	102214	1
R5	Same as R2		
R6	Same as R2		
R7	Same as R2		
R8	RESISTOR, 10k 1/4W, 5%	101570	8
R9	Same as R8		
R10	RESISTOR, 47Ω 1/4W, 5%	101560	2
R11	Same as R8		
R12	Same as R8		
R13	RESISTOR, 910k 1/4W, 5%	101885	4
R14	RESISTOR, 3.9k 1/4W, 5%	101601	2
R15	RESISTOR, Pot 100k 3339H	102298	2

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A6, POWER INVERTER P.C. ASSY (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R16	RESISTOR, 270k 1/4W, 5%	101769	2
R17	Same as R13		
R18	Same as R8		
R19	Same as R8		
R20	Same as R10		
R21	Same as R8		
R22	Same as R8		
R23	Same as R13		
R24	Same as R14		
R25	Same as R15		
R26	Same as R16		
R27	Same as R13		
R28	RESISTOR, 510Ω 1/4W, 5%	101616	1
R29	RESISTOR, 1k 1/4W, 5%	101569	1
U1	INVERTER, 5 Vdc in 180 Vdc and 17 Vdc out	04562261	1
U2	INTEGRATED CIRCUIT, LM3900	045213	1
VR1	DIODE, 1N957B	100416	1
VR2	DIODE, 1N746A	100415	2
VR3	Same as VR2		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTION 08, TCXO OSCILLATOR ASSY 05318401 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
	DELETE		
A5	Standard Oscillator P.C. Assembly	05318301	1
	ADD		
A5 Sep P/L	P.C. Assembly TCXO Oscillator	05318401	1
	TCXO Oscillator Assembly, Option 08	053411	1
Y1	OSCILLATOR, TXCO 10 MHz	100033	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTS 11, 12 & 13 OSCILLATOR CHASSIS MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
U1	INTEGRATED CIRCUIT, MC7824CP	045246	1
Sep P/L	Oscillator Control P.C. Assembly	05318501	1
	OSCILLATOR CHASSIS	053177	1
	TRANSFORMER	019805	1
	OSCILLATOR, Mtg. Bracket	039044	1
	NUT, Tinnerman 6-32	101123	1
	SCREW, 4-40 X 1 1/4 PHM	10062620	2
	SCREW, 6-32 X 5/16 PHM	10063205	5
	SCREW, 6-32 X 3/8 PHM	10063206	5
	WASHER, #4 Splitlock	100711	3
	WASHER, #6 Flat	100704	3
	WASHER, #6 Splitlock	100712	10
	ANCHOR TIE	37021790	1
	SCREW, 4-40 X 5/16	10062605	1
	NUT, 4-40	100622	1
	WASHER, #4 Flat	100703	2
	HEATSINK	053178	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPT 12 HIGH STABILITY OSCILLATOR ASSY MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
A5	OSCILLATOR P.C. ASsembly 10 MHz	05318301	1
A7	OSCILLATOR CHASSIS Assembly	05321501	1
U2	OSCILLATOR, High Stability	033427	1
	OSCILLATOR, OPT 12 Final Assembly	053514	
	SCREW, 5-32 X 3/8 PHM	10053206	5
	WASHER, #6 Splitlock	100712	5
	WASHER, #6 Flat	100704	4
	HEATSINK, Right		1
	OSCILLATOR, Cover Plate	02139811	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION TEST ASSEMBLY DEVIATION METER MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
A1	ADAM P.C. Assembly	05344101	1
CR101	DIODE, Led, Orange	103201	1
CR102	DIODE, Led, Red	103200	1
J101	CONNECTOR, BNC	101170	1
J102	CONNECTOR, 14 pin	101180	1
M1	METER	053855	1
R301	RESISTOR, Pot, 100K, Panel Mount	102221	1
R302	RESISTOR, Pot, 50K, Panel Mount	102239	1
S1	SWITCH, 4 Position, P/B	055097	1
S2	SWITCH, Toggle, MOM, SPDT	102324	1
S3	SWITCH, Toggle, SPDT	102310	1
	PLUG-IN, Sub Panel	0053688	1
	REAR PANEL	055120	1
	DECORATIVE PANEL	0053689	1
	TOP COVER	055121	1
	COMPONENT SHIELD	053864	1
	KNOB, Skirted w/Dot	102764	1
	DRESS NUT, 1/4-40	100893	2
	NUT, #2 hex	100636	2
	SCREW, 5-32 X 1/16 PHM	10063205	6
	SCREW, #2-56 X 3/16 FHM	10070003	2
	SCREW, 2-56 X 5/16	10062505	2
	SCREW, #2-56 X 5/16 PHM	10062503	2
	SCREW, 4-40 X 5/16	10062605	11
	WASHER, #6 Flat	100704	6
	WASHER, #6 Splitlock	100712	6
	WASHER, #4 Flat	100703	3
	WASHER, #4 Splitlock	100711	11
	WASHER, #2 Splitlock	100661	4
	CARD GUIDE	100866	6
	SPACER, #2-56 X 5/16	103226	2
	LUG, Solder BNC	100495	1
	LUG, Solder #10	100491	2

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, .056 µF, 100V Chip	100257	7
C2	CAPACITOR, .001 µF, 50V Mold	100251	3
C3	Same as C1		
C4	Same as C1		
C5	CAPACITOR, .1 µF, 50V Disc	100178	20
C6	Same as C5		
C7	Same as C1		
C8	Same as C1		
C9	Same as C1		
C10	Same as C5		
C11	CAPACITOR, .001 µF, 1 kV Disc	100076	3
C12	Same as C1		
C13	CAPACITOR, 1 µF, 25V Disc	100176	8
C14	CAPACITOR, 100 µF, 25V E1 Ax	100165	7
C15	CAPACITOR, 15-60 pF, VARCER	100234	4
C16	Same as C5		
C17	CAPACITOR, .05 µF, 10V Disc	100122	9
C18	Same as C17		
C19	Same as C5		
C20	CAPACITOR, 1000 pF, 100V C.M.	10024301	2
C21	Same as C17		
C22	Same as C20		
C23	Same as C5		
C24	CAPACITOR, 27 pF, 100V Chip	100299	1
C25	CAPACITOR, 15 pF, 100V Chip	100256	2
C26	Same as C25		
C27	CAPACITOR, .01 µF, 100V Disc	100103	5
C28	Same as C27		
C29	Same as C17		
C30	CAPACITOR, .05 µF, 50V Disc	100134	7
C31	Same as C30		
C32	Same as C5		
C33	Same as C5		
C34	Same as C30		
C35	Same as C17		
C36	Same as C17		
C37	Same as C17		
C38	Same as C17		
C39	Same as C5		
C40	Same as C5		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C41	Same as C30		
C42	CAPACITOR, 9-35 pF VARCER	100135	1
C43	Same as C17		
C44	CAPACITOR, 1000 µF, 10V E1 Ax	102596	1
C45	Same as C13		
C46	CAPACITOR, 470 pF, 300V D.M.	10022101	3
C47	Same as C15		
C48	CAPACITOR, 110 pF, 500V D.M.	102573	1
C49	Not Used		
C50	Same as C46		
C51	CAPACITOR, 82 pF, 500V D.M.	10017201	1
C52	Same as C15		
C53	CAPACITOR, 22 µF, 15V Tant	100125	14
C54	Same as C15		
C55	Same as C5		
C56	Same as C27		
C57	Same as C5		
C58	Same as C14		
C59	Same as C5		
C60	Same as C5		
C61	Same as C30		
C62	Same as C30		
C63	Same as C30		
C64	Same as C27		
C65	Same as C5		
C66	Same as C14		
C67	Same as C5		
C68	Same as C27		
C69	Same as C5		
C70	CAPACITOR, 39 µF, 20V Tant	102561	2
C71	Same as C70		
C72	Same as C13		
C73	CAPACITOR, .47 µF, 100V Myl	100061	1
C74	Same as C11		
C75	CAPACITOR, 1 µF, 100V Ply Crb 5%	100341	1
C76	Same as C53		
C77	Same as C5		
C78	CAPACITOR, .01 µF, 50V 5%	100132	4
C79	CAPACITOR, 56 pF, 500V D.M.	10017901	1
C80	Same as C13		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C81	Same as C11		
C82	CAPACITOR, 5 pF, 500V D.M.	100218	2
C83	Same as C78		
C84	CAPACITOR, .0068 µF, 200V Myl	100192	1
C85	Same as C78		
C86	CAPACITOR, 3.9 µF, 35V Tant	100180	2
C87	Same as C86		
C88	Same as C13		
C89	Same as C13		
C90	CAPACITOR, 33 pF, 500V D.M.	10017501	1
C91	Same as C82		
C92	CAPACITOR, 4.7 µF, 25V Tant	102609	1
C93	Same as C53		
C94	Same as C13		
C95	CAPACITOR, .0022 µF, 200V Myl	100185	1
C96	CAPACITOR, 330 pF, D.M.	10027601	1
C97	Same as C78		
C98	Same as C46		
C99	CAPACITOR, .033 µF 200V MYL	102916	1
C100	Same as C53		
C101	CAPACITOR, 2.2 µF, 20V Tant	100203	1
C102	Same as C14		
C102	Same as C14		
C104	CAPACITOR, 250 µF, 25V El Ax	102614	2
C105	Same as C5		
C106	Same as C2		
C107	Same as C2		
C108	Same as C14		
C109	Same as C14		
C110	Same as C5		
C111	Same as C104		
C112	CAPACITOR, 22 µF, 15V, Tant	100125	1
C113	Same as C13		
CR1	DIODE, 5082-2800	100442	16
CR2	DIODE, A5S138	103197	3
CR3	Same as CR2		
CR4	Same as CR2		
CR5	Same as CR1		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
CR6	Same as CR1		
CR7	Same as CR1		
CR8	Same as CR1		
CR9	Same as CR1		
CR10	Same as CR1		
CR11	DIODE, 5052-0112.	103196	1
CR12	Same as CR1		
CR13	Same as CR1		
CR14	Same as CR1		
CR15	Same as CR1		
CR16	Same as CR1		
CR17	DIODE, MV2114	100438	1
CR18	DIODE, 1N4151	100385	11
CR19	Same as CR18		
CR20	Same as CR18		
CR21	Same as CR18		
CR22	Same as CR18		
CR23	Same as CR18		
CR24	Same as CR18		
CR25	Same as Cr18		
CR26	Same as CR1		
CR27	Same as CR1		
CR28	Same as CR1		
CR29	Same as CR18		
CR30	Same as CR18		
CR31	DIODE, 1N4005	100413	2
CR32	Same as CR31		
CR33	Same as CR1		
CR34	Same as CR18		
FL1	FM4 Matched Set of 3	055489	1
FL2	Same as FL1		
FL3	Same as FL1		
J1	CONNECTOR	101260	1
L1	INDUCTOR, 470 µH	101297	4
L2	INDUCTOR, 100 µH	101306	7
L3	Same as L1		
L4	Same as L1		
L5.	Same as L2		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
L6	Same as L2		
L7	INDUCTOR, Wire Loop		2
L8	Same as L7		
L9	INDUCTOR, 2.7 µH	101299	1
L10	Same as L2		
L11	Same as L2		
L12	INDUCTOR, 6.8 µH	101300	3
L13	Same as L12		
L14	Same as L12		
L15	INDUCTOR, Shielded .27 µH	055551	1
L16	Same as L2		
L17	Same as L2		
L18	INDUCTOR, 1 mH	101303	1
L19	INDUCTOR	055098	1
L20	Same as L1		
Q1	TRANSISTOR, 2N4275	102716	11
Q2	TRANSISTOR, MFE121	101413	1
Q3	TRANSISTOR, 2N3565	101371	4
Q4	TRANSISTOR, SPF759	101416	1
Q5	TRANSISTOR, 2N4264	101412	1
Q6	Same as Q1		
Q7	Same as Q3		
Q8	Same as Q1		
Q9	Same as Q1		
Q10	Same as Q1		
Q11	Same as Q1		
Q12	Same as Q1		
Q13	TRANSISTOR, 2N4393	101417	3
Q14	Same as Q13		
Q15	Same as Q3		
Q16	Same as Q1		
Q17	Same as Q13		
Q18	Same as Q1		
Q19	Same as Q1		
Q20	TRANSISTOR, 2N3906	101378	2
Q21	TRANSISTOR, 2N3904	101377	2
Q22	Same as Q21		
Q23	Same as Q20		
Q24	TRANSISTOR, W/HD WR	101405	1
Q25	TRANSISTOR, 2N5190	101394	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
Q26	Same as Q1		
Q27	TRANSISTOR, 2N3638	101360	1
Q28	TRANSISTOR, 2N3643	101358	1
Q29	Same as Q3		
Q30	TRANSISTOR, 2N3640	101357	1
R1	RESISTOR, 1k 1/4W, 5%	101569	8
R2	RESISTOR, 680Ω 1/4W, 5%	101669	2
R3	RESISTOR, 4.7k 1/4W, 5%	101598	3
R4	RESISTOR, 10k 1/4W, 5%	101570	22
R5	Same as R4		
R6	RESISTOR, 220Ω 1/4W, 5%	101566	2
R7	RESISTOR, Pot 20k Top Adj.	102299	2
R8	RESISTOR, 560Ω 1/4W, 5%	101583	3
R9	Same as R1		
R10	Same as R6		
R11	RESISTOR, 270k, 1/4W, 5%	101769	2
R12	RESISTOR, 560k 1/4W, 5%	101687	1
R13	RESISTOR, 2.7k 1/4W, 5%	101599	8
R14	RESISTOR, 22k, 1/4W, 5%	101572	13
R15	RESISTOR, 330Ω 1/4W, 5%	101536	7
R16	Same as R14		
R17	Same as R13		
R18	RESISTOR, 56Ω 1/4W, 5%	101735	4
R19	Same as R8		
R20	Same as R14		
R21	RESISTOR, 5.6k 1/4W, 5%	101584	3
R22	Same as R18		
R23	Same as R14		
R24	RESISTOR, 2.2k 1/4W, 5%	101562	5
R25	Same as R4		
R26	RESISTOR, 39k TM 1/8W	103192	1
R27	Same as R4		
R29	Same as R11		
R29	RESISTOR, 82k 1/4W, 5%	101578	1
R30	Same as R14		
R31	RESISTOR, 47k 1/4W, 5%	101574	1
R32	RESISTOR, 150k 1/4W, 5%	101604	2
R33	RESISTOR, Pot 5k Top Adj	102099	2
R34	Same as R15		
R35	Same as R4		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R36	RESISTOR, 100Ω 1/4W, 5%	101609	1
R37	Same as R15		
R38	Same as R4		
R39	RESISTOR, 100k 1/4W, 5%	101558	24
R40	RESISTOR, 120k 1/4@, 5%	101580	2
R41	Same as R15		
R42	Same as R8		
R43	RESISTOR, 15Ω 1/4W, 5%	1-1764	1
R44	RESISTOR, 2.7k 1/8W, 5%	101803	1
R45	RESISTOR, Pot 500Ω, Top Adj.	102163	2
R46	Same as R13		
R47	Same as R14		
R48	Same as R15		
R49	RESISTOR, 47Ω 1/4W, 5%	101560	4
R50	Same as R14		
R51	RESISTOR, 330Ω 1/8W, 5%	1-1704	1
R52	RESISTOR, 270Ω 1/4W, 5%	1-1542	1
R53	Same as R14		
R54	RESISTOR, 39k 1/4W, 5%	101561	1
R55	RESISOTR, 4.7Ω 1/4W, 5%	101796	1
R56	RESISTOR, 3.9k 1/4W, 5%	101601	2
R57	Same as R15		
R58	Same as R31		
R59	RESISTOR, 470Ω 1/4W, 5%	101625	2
R60	Same as R59		
R61	RESISTOR, 470k 1/4W, 5%	101630	3
R62	RESISTOR, 27k 1/4W, 5%	101587	1
R63	Same as R31		
R64	Same as R61		
R65	Same as R21		
R66	Same as R39		
R67	Same as R39		
R68	RESISTOR, 750Ω 1/4W, 5%	101689	2
R69	Same as R45		
R70	Same as R68		
R71	Same as R4		
R72	RESISTOR, 1.2k 1/4W, 5%	101581	1
R73	Same as R1		
R74	RESISTOR, 22Ω 1/4W, 5%	101696	1
R75	Same as R4		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R76	Same as R39		
R77	Same as R40		
R78	Same as R39		
R79	Same as R1		
R80	Same as R15		
R81	Same as R4		
R82	Same as R4		
R83	Same as R4		
R84	Same as R13		
R85	Same as R61		
R86	RESISTOR, 680k 1/4W,5%	101675	1
R87	RESISTOR, 1.8k 1/4W, 5%	101602	1
R88	Same as R14		
R89	Same as R24		
R90	Same as R14		
R91	Same as R39		
R92	Same as R1		
R93	RESISTOR, 1M 1/4@, 5%	101605	3
R94	Same as R39		
R95	RESISTOR, Pot 100k, Top Adj.	102298	4
R96	Same as R39		
R97	Same as R39		
R98	RESISTOR, 33k 1/4W, 5%	101576	3
R99	Same as R98		
R100	Same as R39		
R101	Same as R98		
R102	Same as R39		
R103	Same as R14		
R104	RESISTOR, 15k, 1/4W, 5%	101552	1
R105	Same as R31		
R106	Same as R4		
R107	Same as R93		
R108	Same as R39		
R109	RESISTOR, 220k 1/4W, 5%	101610	1
R110	Same as R39		
R111	Same as R39		
R112	Same as R32		
R113	Same as R31		
R114	Same as R39		
R115	Same as R7		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R116	Same as R4		
R117	Same as R24		
R118	Same as R1		
R119	Same as R39		
R120	RESISOTR, 180Ω 1/4W, 5%	101668	2
R121	Same as R120		
R122	Same as R4		
R123	Same as R4		
R124	Same as R31		
R125	Same as R14		
R126	Same as R95		
R127	RESISTOR, 2.7M 1/4W, 5%	101621	1
R128	Same as R1		
R129	Same as R4		
R130	Same as R3		
R131	RESISTOR, 10k .12W, 1%	102098	2
R132	RESISTOR, 2.2M 1/4W, 5%	101618	5
R133	Same as R131		
R134	Same as R3		
R135	Same as R4		
R136	Same as R4		
R137	Same as R49		
R138	Same as R31		
R139	Same as R31		
R140	RESISTOR, 12k 1/4W, 5%	101565	2
R141	Same as R39		
R142	Same as R1		
R143	RESISTOR, 10M 1/4W, 5%	101564	2
R144	Same as R39		
R145	Same as R31		
R146	Same as R2		
R147	RESISTOR, Pot 1k, Top Adj	103116	2
R148	Same as R147		
R149	RESISTOR, 8.2k 1/4W, 5%	101595	1
R150	Same as R13		
R151	Same as R132		
R152	RESISTOR, 2k 1/4W, 5%	101553	1
R153	RESISTOR, 1.5k 1/4W, 5%	101577	1
R154	Same as R132		
R155	Same as R39		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
R156	Same as R4		
R157	Same as R132		
R158	Same as R31		
R159	Same as R4		
R160	Same as R31		
R161	Same as R14		
R162	Same as R95		
R163	RESISTOR, 68k 1/4W, 5%	101597	1
R164	Same as R31		
R165	Same as R4		
R166	Same as R143		
R167	RESISTOR, 5.1M 1/4W, 5%	101692	1
R168	Same as R39		
R169	Same as R93		
R170	RESISTOR, 6.65k .12W, 1% MF	102094	1
R171	RESISTOR, 2.32k .12W, 1% MF	102096	1
R172	RESISTOR, 806Ω .12W, 1% MF	103194	1
R173	RESISTOR, 200Ω .12W, 1% MF	103195	1
R174	Same as R4		
R175	Same as R39		
R176	Same as R21		
R177	Same as R132		
R178	Same as R39		
R179	Same as R39		
R180	Same as R24		
R181	Same as R49		
R182	Same as R18		
R183	Same as R39		
R184	Same as R24		
R185	Same as R18		
R186	Same as R49		
R187	Same as R13		
R188	RESISTOR, 75k 1/4W, 5%	101613	1
R189	RESISTOR, 30k 1/4W, 5%	101549	1
R190	Same as R33		
R191	Same as R13		
R192	RESISTOR, 51k 1/4W, 5%	101590	1
R193	Same as R95		
R194	RESISTOR, 110k 1/4W, 5%	101617	1
R195	Same as R13		
R196	Same as R140		

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION A1 ADAM PC ASSEMBLY 05344101 (Contd) MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
TP1	Test Point	100565	17
TP2	Same as TP1		
TP3	Same as TP1		
TP4	Same as TP1		
TP5	Same as TP1		
TP6	Same as TP1		
TP7	Same as TP1		
TP8	Same as TP1		
TP9	Same as TP1		
TP10	Same as TP1		
TP11	Same as TP1		
TP12	Same as TP1		
TP13	Same as TP1		
TP14	Same as TP1		
TP15	Same as TP1		
TP16	Same as TP1		
TP17	Same as TP1		
U1	INTEGRATED CIRCUIT, CA3012	025703	1
U2	INTEGRATED CIRCUIT, SN7474N	025241	1
U3	INTEGRATED CIRCUIT, CA3018	025720	1
U4	INTEGRATED CIRCUIT, LM301A	025745	2
U5	INTEGRATED CIRCUIT, LM4250CH	045258	5
U6	Same as U5		
U7	Same as U5		
U8	Same as U5		
U9	Same as U4		
U10	Same as U5		
U11	INTEGRATED CIRCUIT, MC14013CP	103199	1
U12	INTEGRATED CIRCUIT, MC14528CP	045289	1
U13	INTEGRATED CIRCUIT, LM324N	103198	2
U14	Same as U13		
U15	INTEGRATED CIRCUIT, DC4010AE	045285	1
U16	INTEGRATED CIRCUIT, RC4194D	045255	1
U17	INTEGRATED CIRCUIT, LM75453	045291	1
	SWAGE, Terminal BIF	100482	41
	SCREW, 4-40 X 3/8 PHM	10062606	2
	WASHER, #4 Flat	100703	2
	NUT, 4-40, Kep	100941	2

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTION 05 OSCILLATOR POWER INVERTER ASSY MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
	OPT. 05 Osc. Power Inverter Assembly	05522801	1
C1	CAPACITOR, 1 µF, 25V Disc	100176	1
C2	CAPACITOR, .01 µF, 500V Disc	100075	1
C3	CAPACITOR, .005 µF, 1.4 kV Disc	102823	1
C4	CAPACITOR, 47 µF, 6V Tant	100224	1
C5	CAPACITOR, .02 µF, 500V Disc	106489	1
C6	CAPACITOR, 100 µF, 25V El Ax	100165	1
C7	CAPACITOR, .1 µF, 50V Disc	100178	1
C8	CAPACITOR, 100 µF, 64V El Ax	102598	1
CR1	DIODE, 1N4933	100450	1
CR2	DIODE, 1N4005	100413	1
L1	INDUCTOR	055525	1
Q1	TRANSISTOR, 2N3646	101369	2
Q2	Same as Q1		
Q3	P/O shipping assembly		
R1	RESISTOR, 270Ω 1/4W, 5%	101542	1
R2	RESISTOR, 2.7k 1/4W, 5%	101598	1
R3	RESISTOR, 820Ω 1/4W, 5%	101567	1
R4	RESISTOR, 100Ω 1W, 5%	101856	1
R5	RESISTOR, 47Ω 1/4W, 5%	101560	1
R6	RESISTOR, 100Ω 1/4W, 5%	101609	2
R7	Same as R6		
U1	INTEGRATED CIRCUIT, MC3380	103379	1
VR1	ZENER DIODE, 1N753A	100387	1
VR2	ZENER DIODE, 1N971B	100402	1
	POT CORE	103377	2
	TERMINAL	100482	7
	SCREW, 8-32 X 1, NYL	103374	1
	NUT, #8 NYL	103375	1
	WASHER, Flat .1871D, NYL	101011	1
	COIL FORM	103378	1
	SWAGE, Spacer #6-32 X 1/4	100783	4

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION INVERTER P.C. ASSEMBLY 05543701 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
C1	CAPACITOR, 150 µF, 15V Tant	100209	1
C2	CAPACITOR, 1 µF, 35V Tant	100082	1
C3	CAPACITOR, 1 µF, 25V Tant	100176	4
C4	CAPACITOR, 100 µF, 20V Tant	100208	2
C5	Same as C4		
C6	Same as C3		
C7	Same as C3		
C8	Same as C3		
C9	CAPACITOR, .01 µF, 100V Disc	100103	1
C10	CAPACITOR, 22 µF, 15V Tant	100125	1
CR1	DIODE, 1N4005	100413	2
CR2	Same as CR1		
CR3	DIODE, 1N4151	100385	2
CR4	Same as CR3		
L1	INDUCTOR, 100 µH, Line Filter	101328	1
Q1	TRANSISTOR, P/O chassis assembly		
Q2	TRANSISTOR, 2N3646	101369	3
Q3	Same as Q2		
Q4	Same as Q2		
Q5	TRANSISTOR, MPSA12	101396	1
Q6	TRANSISTOR, P/O chassis assembly		
R1	RESISTOR, 100Ω 1/4W, 5%	101609	1
R2	RESISTOR, 10k 1/4W, 5%	101570	1
R3	RESISTOR, 22k 1/4W, 5%	101572	4
R4	Same as R3		
R5	RESISTOR, 1k, Pot 4T Top Adj	103116	1
R6	RESISTOR, 4.7k 1/4W, 5%	101598	1
R7	RESISTOR, 1.5k 1/4W, 5%	101577	1
R8	Same as R3		
R9	Same as R3		
R10	RESISTOR, 1k 1/4W, 5%	101569	2
R11	Same as R10		
R12	RESISTOR, 39Ω 1/4W, 5%	101733	1
U1	INTEGRATED CIRCUIT, Inverter	04562261	1
U2	INTEGRATED CIRCUIT, LM723CN	025761	1
VR1	ZENER DIODE, 1N967B	100404	1
VR2	ZENER DIODE, 1N957B	100416	1
	TERMINAL	100482	5
	TERMINAL	100508	10
	WASHER, .281 X .031, NYL	100815	2

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTION 06, BATTERY CHARGER ASSY 05543601 MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
CR1	DIODE, 30S05	103252	1
CR2	DIODE, 1N4151	100385	1
Q1	TRANSISTOR, MPSA65	101404	1
Q2	Not Used		
Q3	TRANSISTOR, 2N3904	101377	2
Q4	Same as Q3		
R1	RESISTOR, 1k 1/4W, 5%	101569	1
R2	RESISTOR, 10Ω 1/4W, 5%	101557	1
R3	RESISTOR, 50Ω POT 1 T Top Adj	101906	1
R4	RESISTOR, 390Ω 1/4W, 5%	101592	4
R5	RESISTOR, 120Ω 1W, 5%	101839	1
R6	RESISTOR, 1Ω 2W, Wire Wound	102214	1
R7	Same as R4		
R8	RESISTOR, 510Ω 1/4W, 5%	101616	1
R9	Same as R4		
R10	Same as R4		
VR1	ZENER DIODE, 1N957B	100416	1
	TERMINAL	100508	6
	SPACER SWAGE, 4-40 X 1/8	100492	2

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTION 05 EXT DC SUPPLY CHASSIS ASSEMBLY MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
Q1	TRANSISTOR, MJE2955	106583	2
Q2	Same as Q1		
	CHASSIS, External DC Supply (Stacked)	055045	1
	INVERTER, P.C. Assembly Sep. P/L	05543701	1
	SCREW, 4-40 X 9/16 PHMS	100835	1
	CABLE, Tie Anchore	102747	1
	SCREW, 4-40 X 3/8 PHMS	10062606	6
	WASHER, #4 Flat	100703	5
	WASHER, #4 Split	100711	5
	NUT, 4-40 Hex	100707	1
	DIODE, MR1120R (Hardware included)	100424	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION OPTION 06 6V BATTERY PACK ASSEMBLY MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
Q1	TRANSISTOR, MJE2955	106583	2
Q2	TRANSISTOR, 2N5193	101405	1
Q3	Not Used		
Q4	Not Used		
Q5	Not Used		
Q6	Same as Q1		
	BATTERY CHASSIS (Stacked)	055445	1
	BATTERY	100042	2
	BATTERY CLAMP, Front Assembly	04561401	1
	BATTERY CLAMP, Rear Panel	04561501	1
	INVERTER, P.C. Assembly	05543701	1
	BATTERY CHARGER, P.C. Assembly	05543601	1
	SCREW, 4-40 X 3/8 FHMS	10072006	5
	NUT, 4-40 Hex	100707	4
	SCREW, 4-40 X 5/16	10062605	12
	WASHER, #4 Split	100711	13
	WASHER, #4 Flat	100703	5
	SCREW, 4-40 X 9/16 PHMS	100835	1
	CABLE, Tie Anchor #4 Mtg	102747	1
	CABLE, Tie Anchor #6 Mtg	102748	2
	WASHER, #6 Split	100712	2
	SCREW, 6-32 X 5/16 PHM	10063205	2
	CABLE TIE	100753	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION INSTALLATION & SHIPPING OPT 6 BATTERY PK MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
	BATTERY PACK, Assembly Opt 06	055457	1
	SPACER, Male-Female 6-32 X 2/3	100968	8
	SCREW, 6-32 X 3/8 PHM	10063206	9
	WASHER, #6 Flat	100662	5
	WASHER, #6 Split	100712	9
	WASHER, Fibre	100619	4
	CABLE, Clamp 3/16	102931	1
	CABLE TIE	100753	12

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION INSTALLATION & SHIPPING OPT 05 EXT DC MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
Q3	TRANSISTOR, UPT U21	103376	1
	NUT, 6-32 Hex	100706	2
	WASHER, Splitlock #6	100712	1
	LUG, Solder #6	100486	1
	WASHER, #6 Flat	100704	2
	WASHER, #6 Nylon Shldr	102893	2
	SCREW, 6-32 X .500	10063208	2
	INSULATOR mica	100551	1
	OSCILLATOR, Power Inverter, P.C. Assy	05522801	1
	OPTION 07, Assembly	055475	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION INSTALLATION & SHIPPING OPT 07 EXT DC MFR CODE 52542

REF	DESCRIPTION	PART NO.	QTY PER ASSY
	CONNECTOR, 2 pin female	102146	1
	CONNECTOR, 2 pin male	103145	1
	NUT, 4-40 kep	100941	2
	SPACER, Connector	055366	1
	SCREW, 4-40 3/4 PHMS	10062612	2
	FUSE, 4A 3AG	103075	1
	HOLDER, Fuse	102409	1
	TIE, Cable	100753	12
	CLAMP, Calbe 3/16	102931	1
	WASHER, #6 Flat	100662	1
	WASHER, Fibre	100519	4
	SCREW, 6-32 1/8 PHMS	10063206	5
	WASHER, #6 Split	100712	5
	SPACER, 6-32 3/8	103394	4
	KIT, Wiring Opt. 07	A055474	4
	EXTERNAL DC POWER SUPPLY, Assy Opt 07	C055473	1

REPLACEABLE PARTS LIST

EQUIPMENT/ASSEMBLY DESIGNATION INSTALLATION & SHIPPING MODEL 6255 MFR CODE 52542

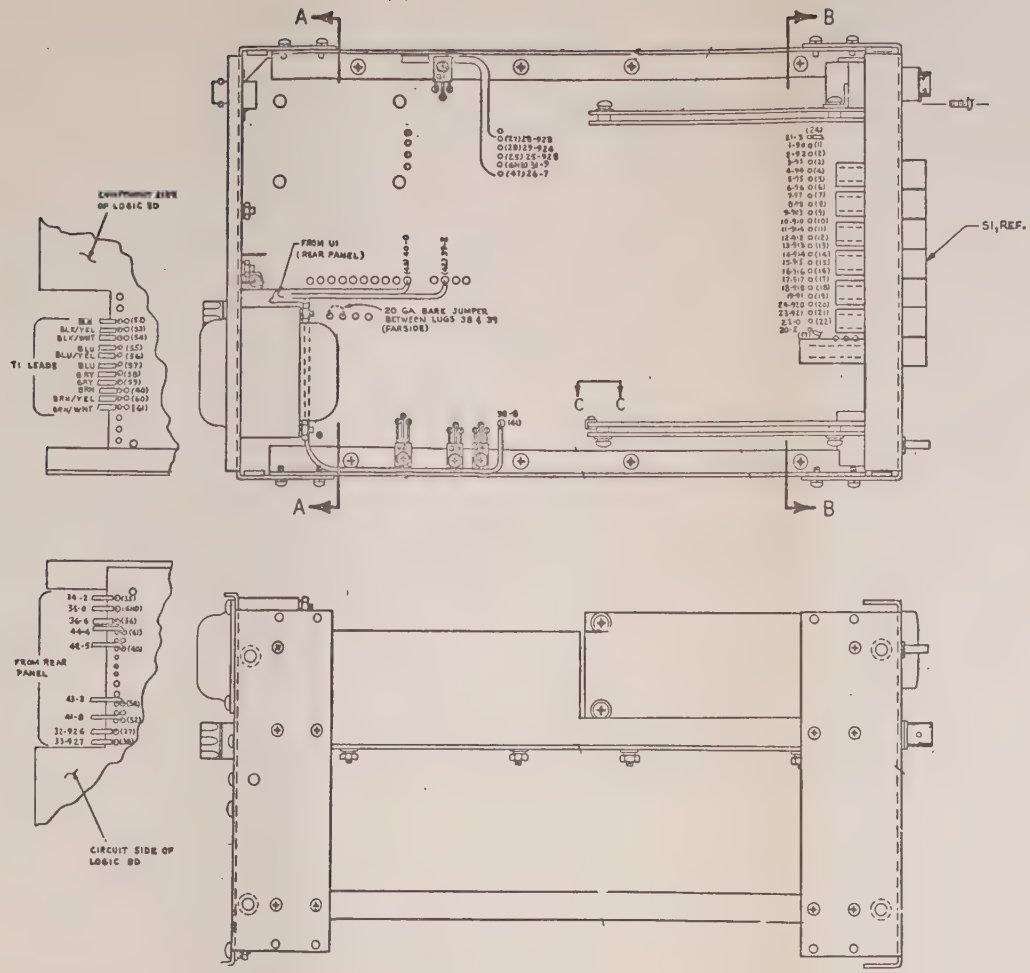
REF	DESCRIPTION	PART NO.	QTY PER ASSY
	SCREW, 6-32 X 1-2 PHMS	10063208	1
	WASHER, #6 Flat	100704	1
	CLAMP, Cable 1/8"	102831	1
	CLAMP, Cable	100716	1
	SPEAKER, 3.2Ω	103251	1
	KIT, wiring	B05522301	1
	DEVIATION METER, Assy	D005096	1

CHAPTER 7
DRAWINGS

7.1 INTRODUCTION

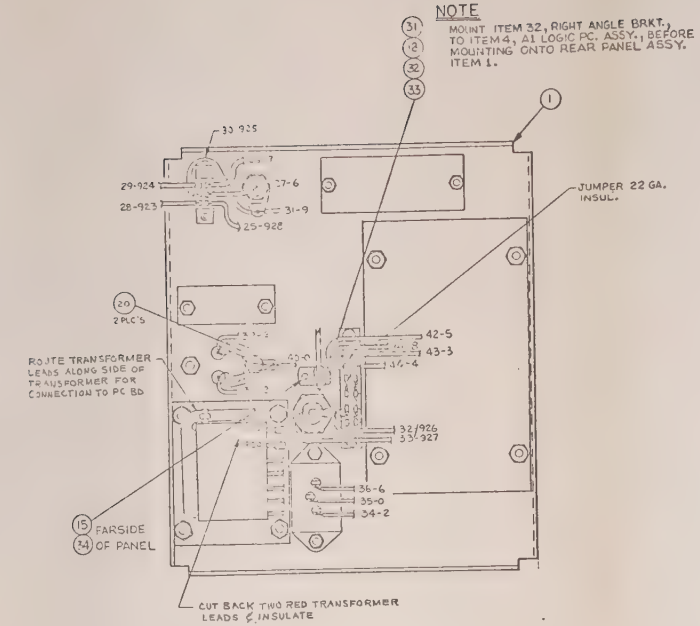
This chapter contains the drawings for all configurations of the Counter/Deviation Meter. They are arranged with the Counter assembly drawings, followed by the "A" numbered assemblies. The Deviation Meter assembly drawings follow the Counter drawings.

PAGE		TITLE
7-2	055069,	Counter Universal Chassis Assembly
7-4	055073,	Counter, Interconnect Block Diagram
7-5	05368601,	Rear Panel Assembly
7-6		Logic Assembly
7-7	7-05377001,	Logic Assembly, Schematic Diagram
7-9	7-05528201,	Readout Assembly, Schematic Diagram
7-10		Readout Assembly
7-11	7-05589101,	Amplifier Assembly, Schematic Diagram
7-12		Amplifier Assembly
7-13	7-05349901,	Prescaler Assembly, Schematic Diagram
7-14		Prescaler Assembly
7-15		Oscillator, Assembly and Schematic
7-16		Oscillator Assembly, Option 11, 12, 13
7-17	7-055703,	Oscillator Assembly, Option 11,12,13 Schematic Diagram
7-18	7-055386,	External DC Option 05, Schematic Diagram
7-19		External DC Option 07, Schematic Diagram
7-20		Battery Pack Option 06, Schematic Diagram
7-21		Inverter Assembly
7-22		6-Volt Battery Pack Assembly
7-23		Test Assembly, Deviation Meter
7-24	055254,	Installation Drawing and Shipping, Deviation Meter
7-25		Automatic Deviation Analysis Meter Assembly
7-26	7-05344101,	Automatic Deviation Analysis Meter, Schematic Diagram
7-28	055495,	Installation and Shipping Assembly Drawing, 6V Battery Pack
7-29	055487,	Installation and Shipping Assembly Drawing, External DC Supply, Option 05
7-30	055475,	Installation and Shipping Assembly Drawing, External DC Supply, Option 07

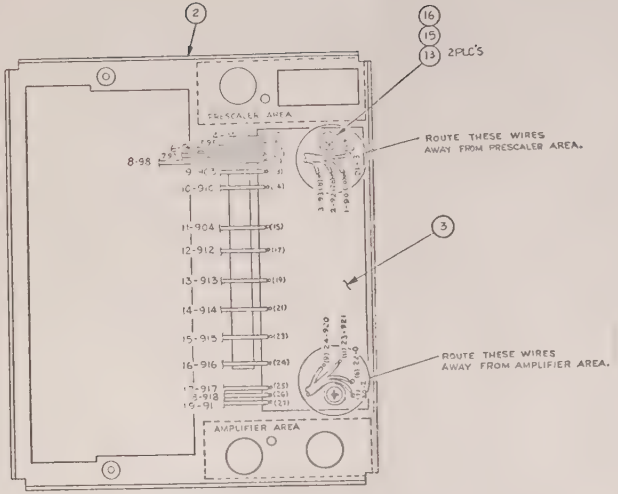


NOTES:
1. MAKE SURE PC. PLUG-IN'S ARE PROPERLY ALIGNED IN EDGE CONNECTORS BEFORE TIGHTENING RAILS TO SUB-PANEL, ALSO CHECK SWITCH POSITIONING.

COUNTER UNIVERSAL CHASSIS ASSEMBLY
#055069 SHEET 1 OF 2

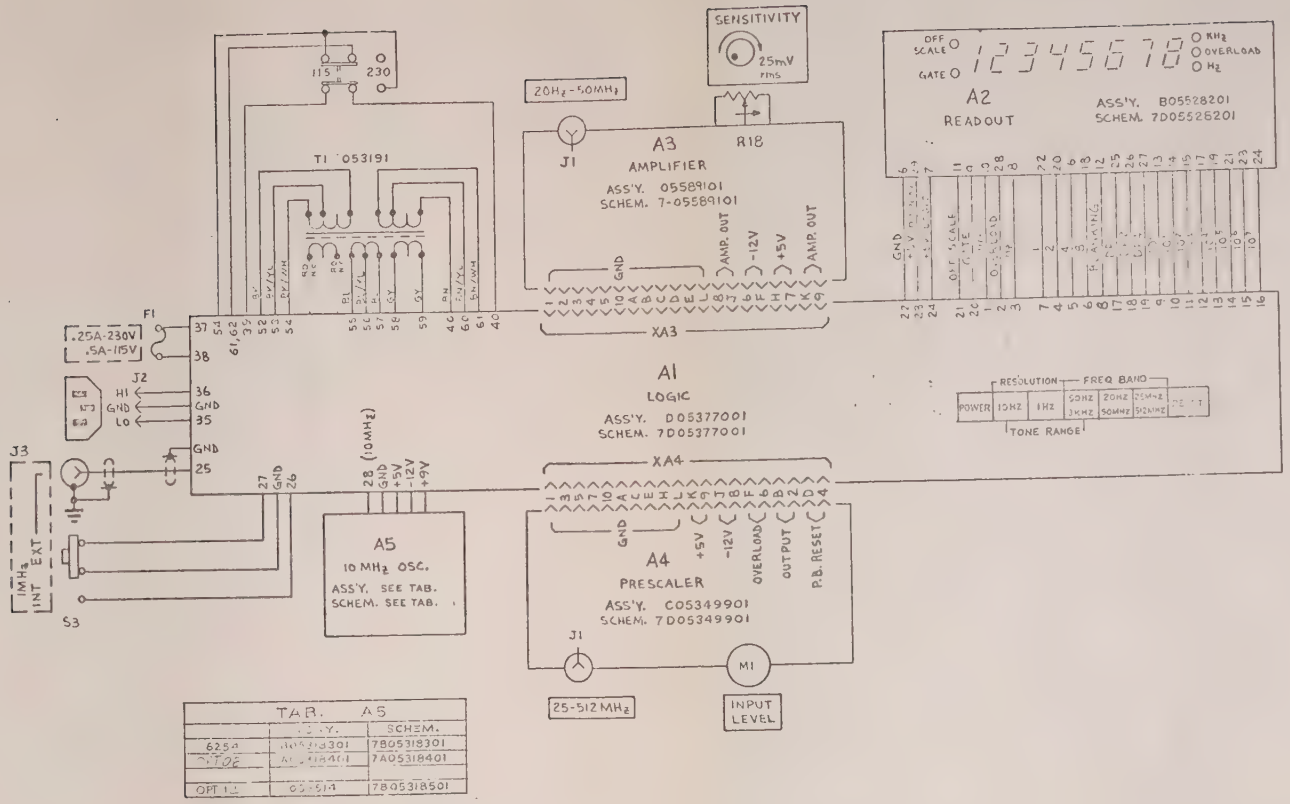


DETAIL A-A



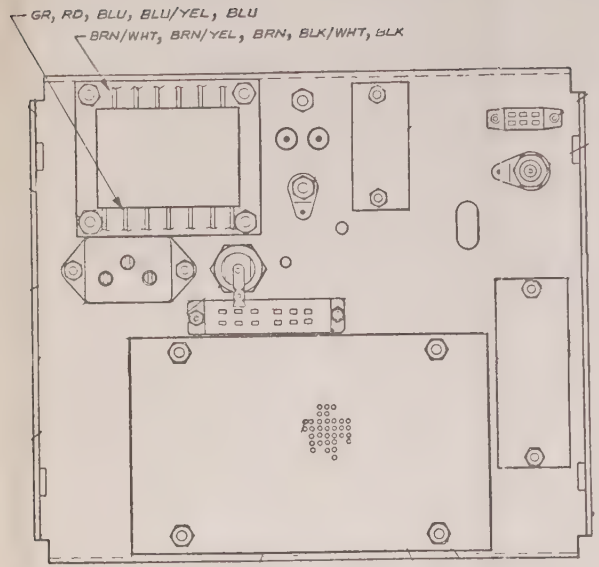
DETAIL B-B

COUNTER UNIVERSAL CHASSIS ASSEMBLY
#055069 (SHEET 2 of 2)

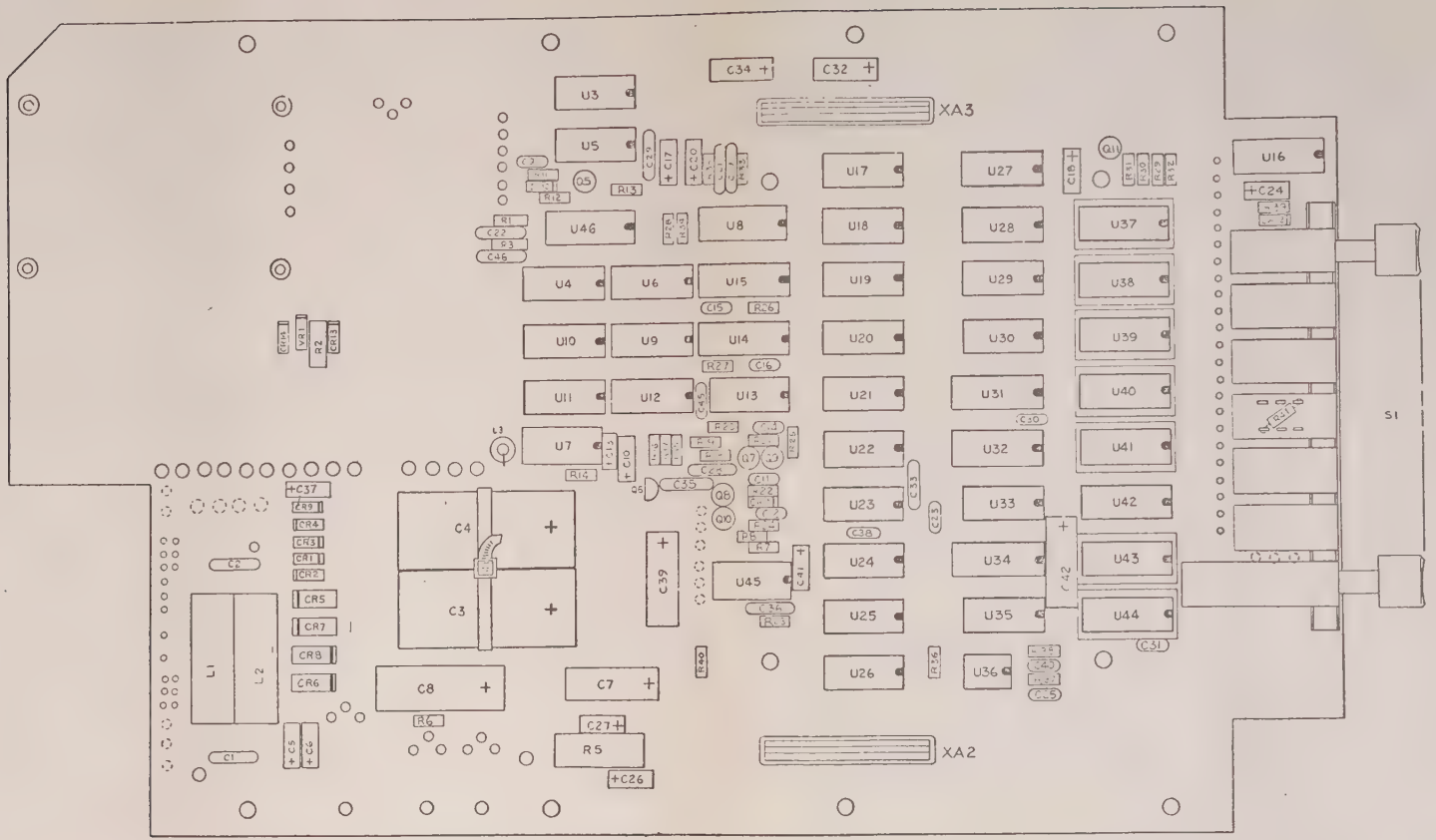


TAB. A5		
	ASS'Y.	SCHEM.
6254	[illegible]3301	7805318301
6255	[illegible]8401	7A05318401
OPT 10	05[illegible]5M	7805318501

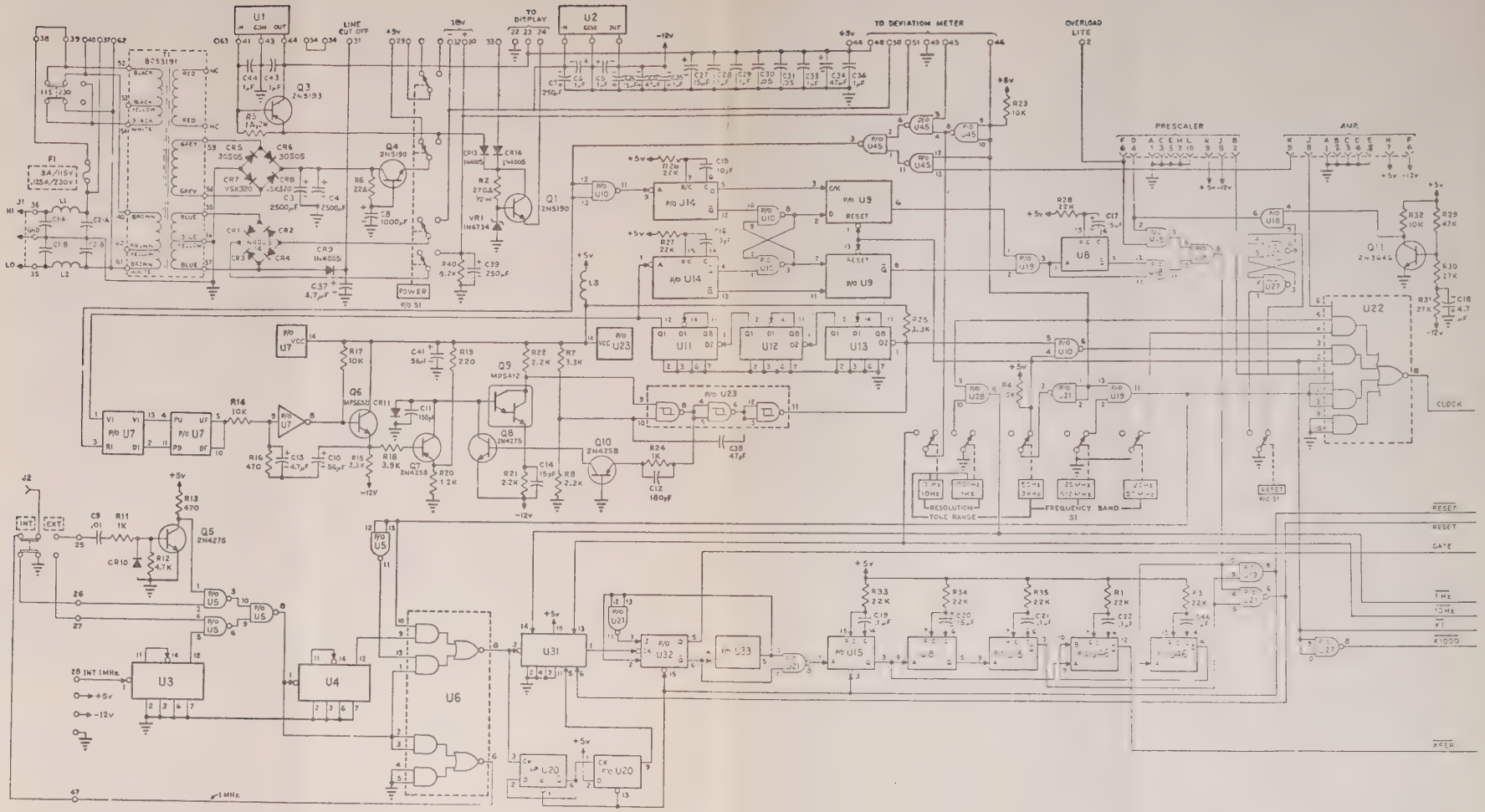
COUNTER, INTERCONNECT
BLOCK DIAGRAM #055073



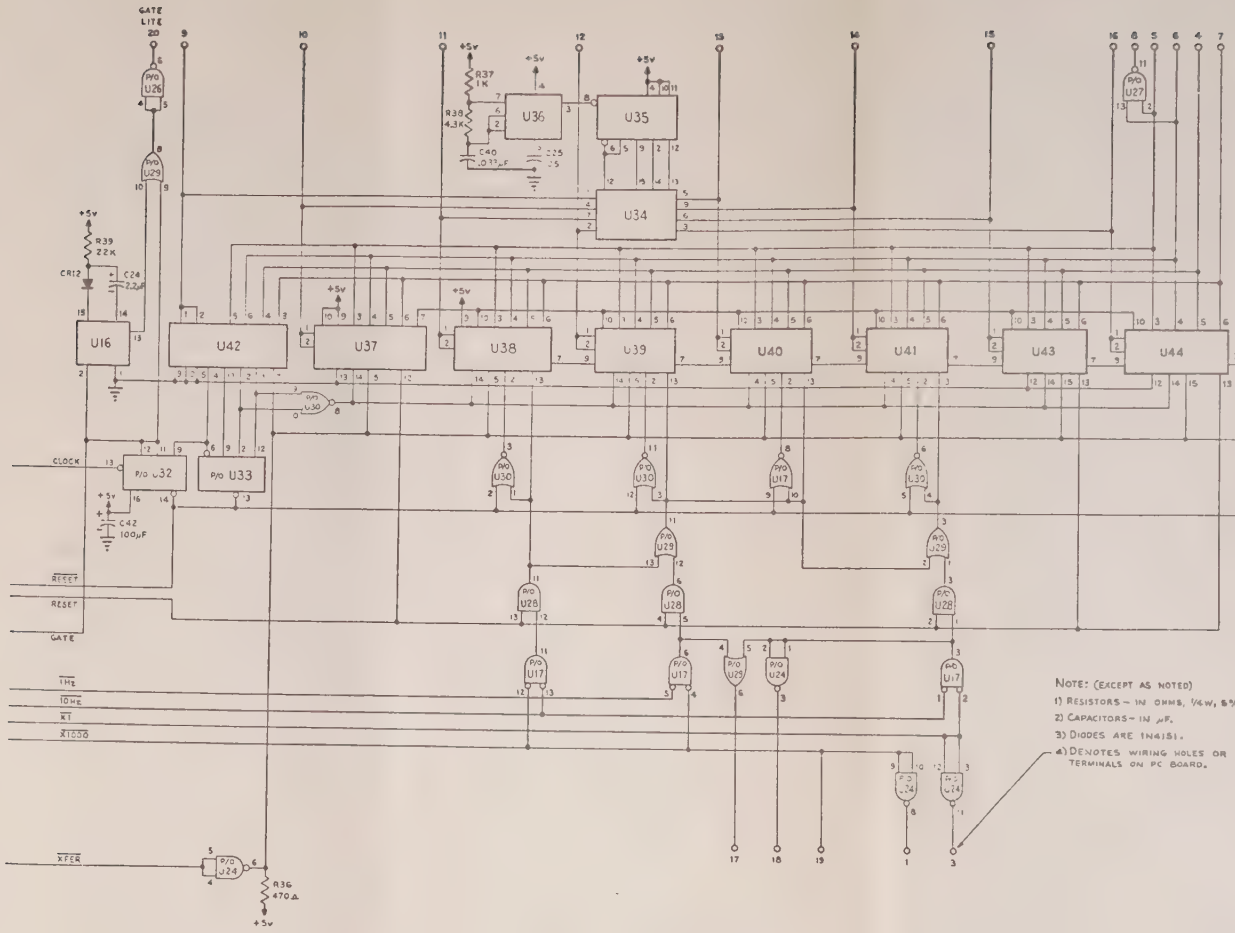
REAR PANEL ASSEMBLY #05368601



A1, LOGIC ASSEMBLY
#D05377001



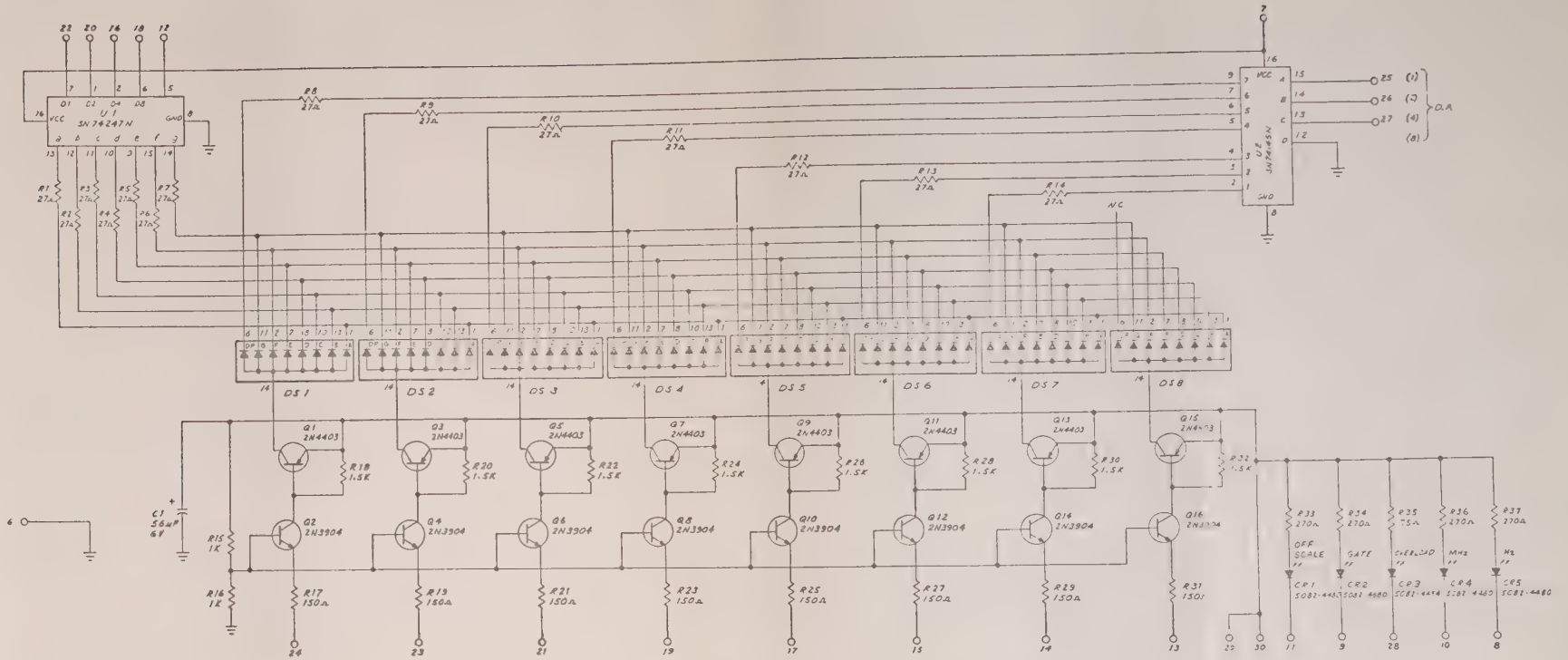
A1, LOGIC ASSEMBLY SCHEMATIC DIAGRAM
#7-05377001 (SHEET 1 of 2)



	TYPE			GND
U1	LM3[illegible]			7
U2	MC79[illegible]CP			7
U3	SN7490N	5		7
U4	▼	5		7
U5	SN7400N	14		7
U6	SN7451N	4		2
U7	MC4044P			8
U8	SN74123N	4	8	7
U9	SN7474N	4		8
U10	SN7400N	4		7
U11	|	5	10	1
U12	|	5	10	8
U13	▼	5	10	8
U14	SN74123N	16	8	8
U15	|	16	8	8
U16	▼	16	8	8
U17	MC3002P	14	7	8
U18	MC3001P	14	7	8
U19	▼	14	7	8
U20	SN7474N	14	7	8
U21	SN7400N	14	7	8
U22	SN74S64N	14	7	8
U23	SN74S132N	~	7	8
U24	SN7426N	14	7	8
U25	SN7474N	14	7	8

	TYPE			GND
U26	SN74[illegible]N	4	11	7
U27	SN74[illegible]P	4	11	7
U28	SN74[illegible]P	4	11	7
U29	SN74[illegible]P	4	11	7
U30	SN74[illegible]P	4	11	7
U31	SN74S55[illegible]	8	16	1
U32	SN74S55[illegible]	16	8	8
U33	SN74S55[illegible]	16	8	8
U34	SN74S55[illegible]	16	8	8
U35	SN74S55[illegible]	16	8	8
U36	SN74S55[illegible]	16	8	8
U37	SN74S55[illegible]	16	8	8
U38	SN74S55[illegible]	16	8	8
U39	SN74S55[illegible]	16	8	8
U40	SN74S55[illegible]	16	8	8
U41	SN74S55[illegible]	16	8	8
U42	SN74S55[illegible]	16	8	8
U43	SN74S55[illegible]	16	8	8
U44	SN74S55[illegible]	16	8	8
U45	SN7400N	14	7	8
U46	SN74123N	16	8	8

A1, LOGIC ASSEMBLY SCHEMATIC DIAGRAM
#7-05377001 (SHEET 2 of 2)

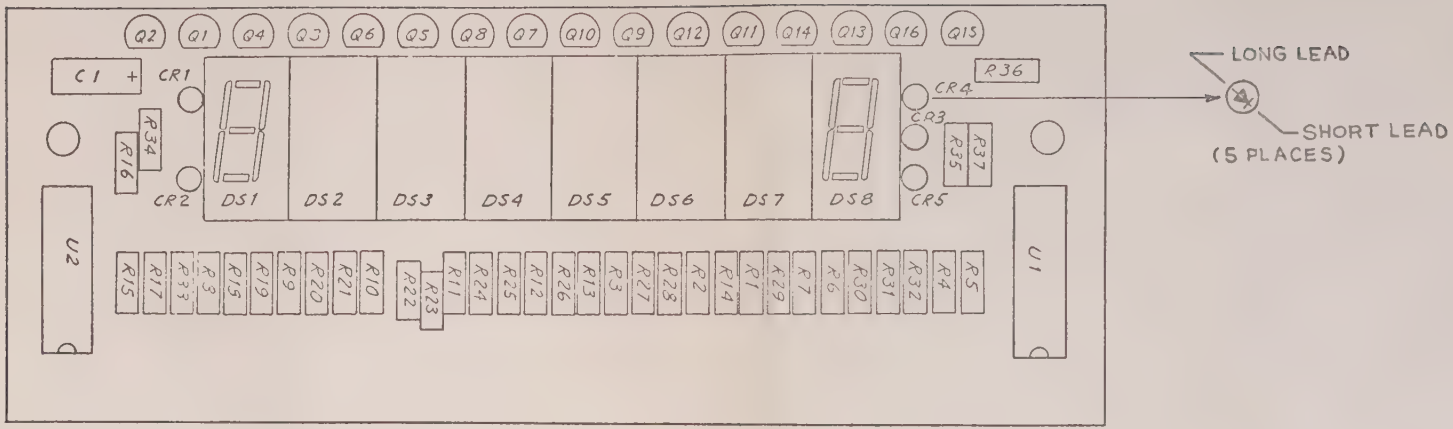


DS1 DS8

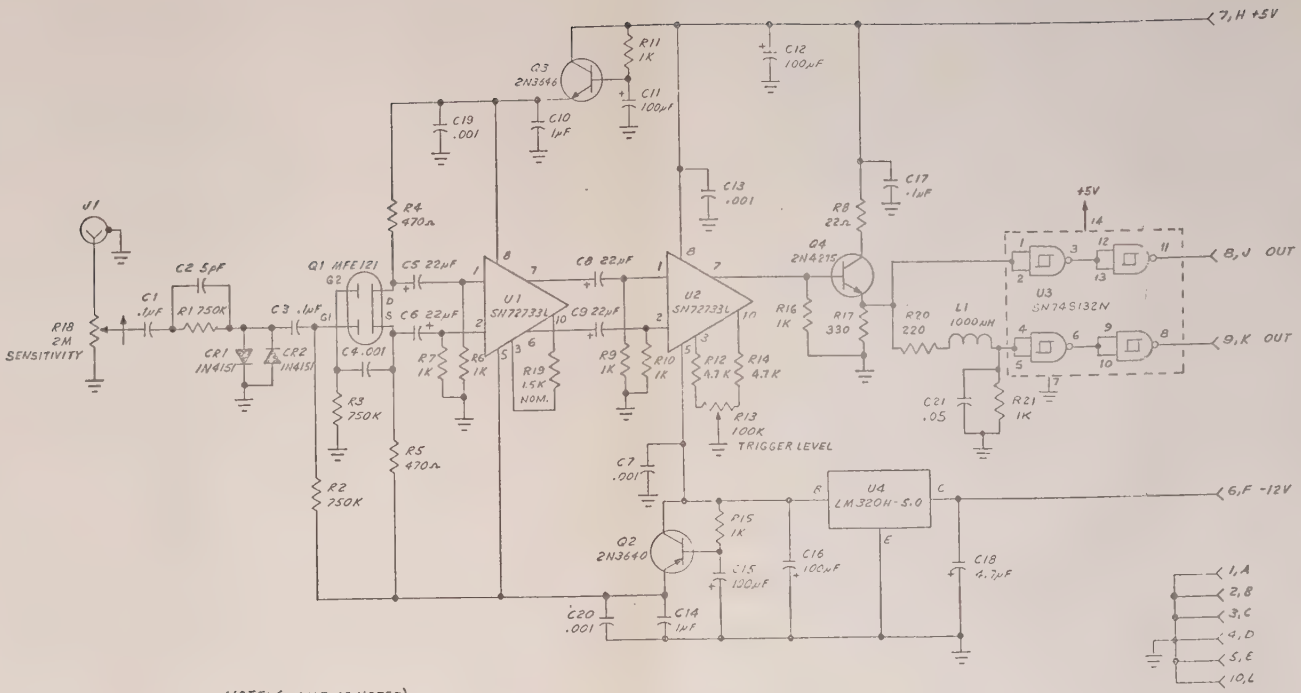
MAN3610 TYP.

NOTES:
1) UNLESS OTHERWISE SPECIFIED: ALL RESISTORS ARE 1/4W 5% IN OHMS

A2, READOUT ASSEMBLY, SCHEMATIC
DIAGRAM #7-05528201



A2, READOUT ASSEMBLY
#B05528201

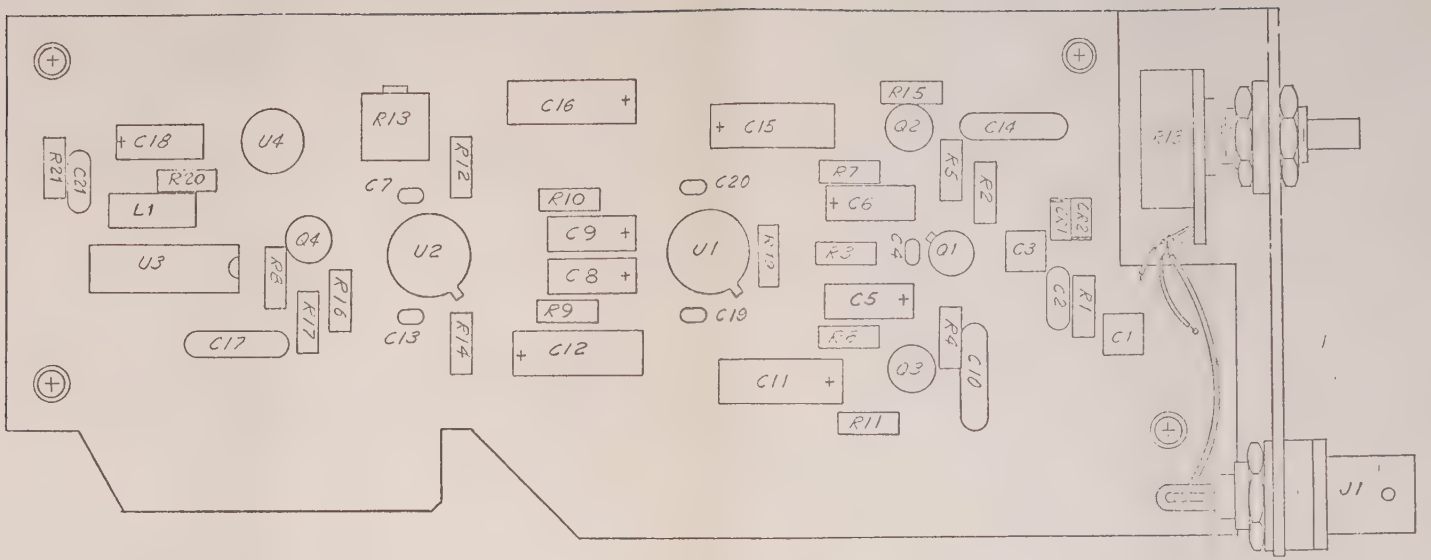


NOTE: (EXCEPT AS NOTED)

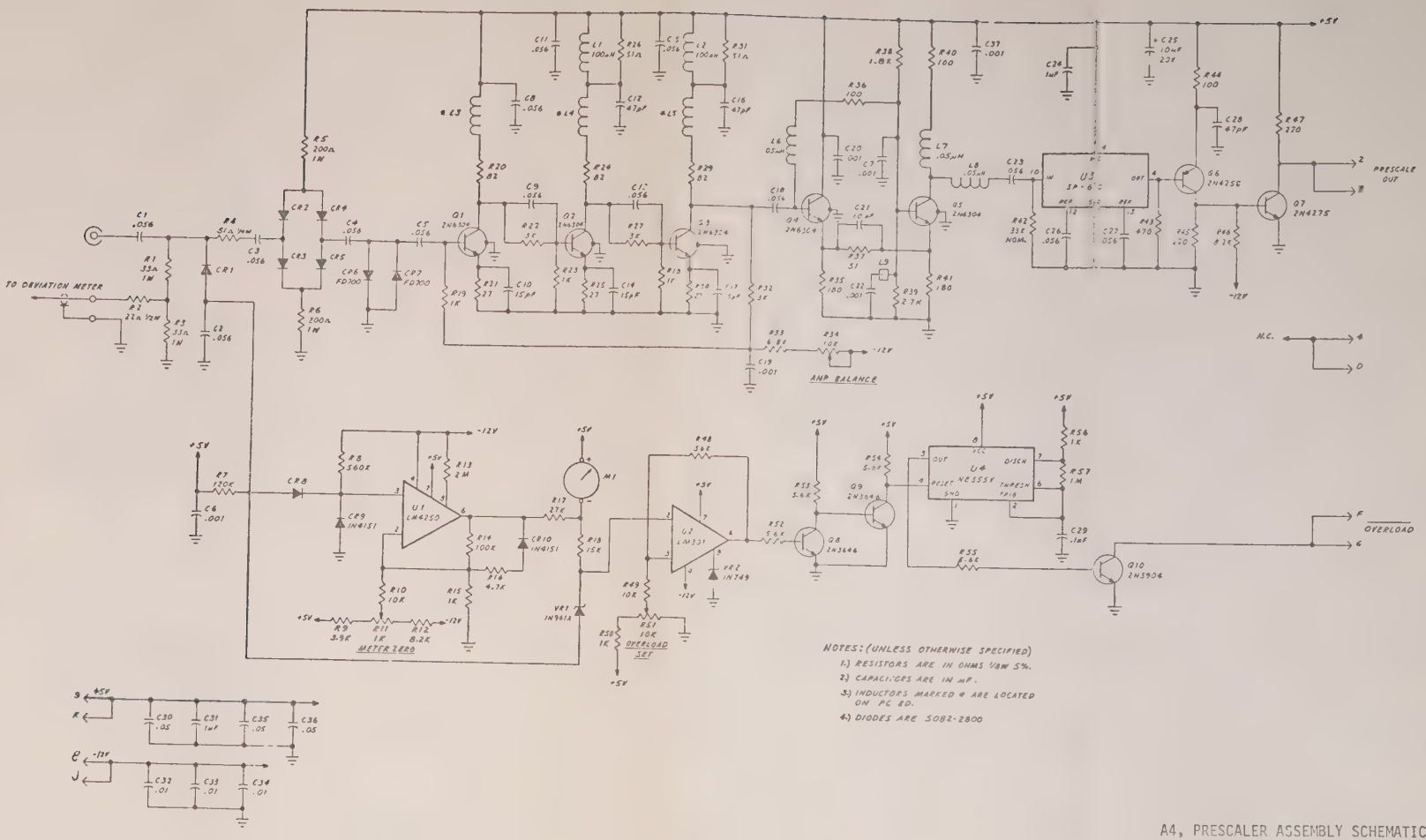
1.) RESISTORS ARE IN OHMS, 1/4W, 5%

2.) CAPACITORS ARE IN μF

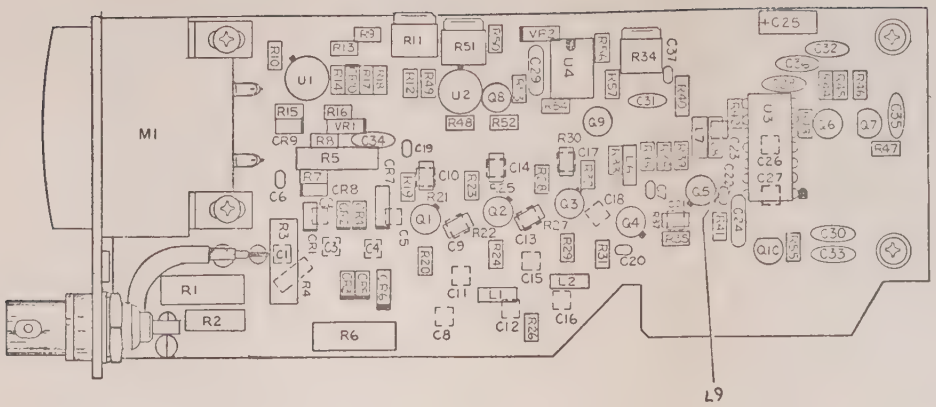
A3, AMPLIFIER ASSEMBLY SCHEMATIC
DIAGRAM #7-05589101

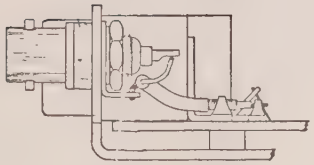


A3, AMPLIFIER ASSEMBLY
#B05589101

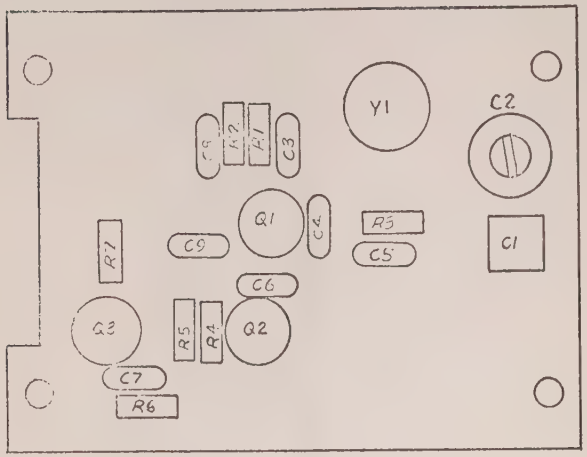


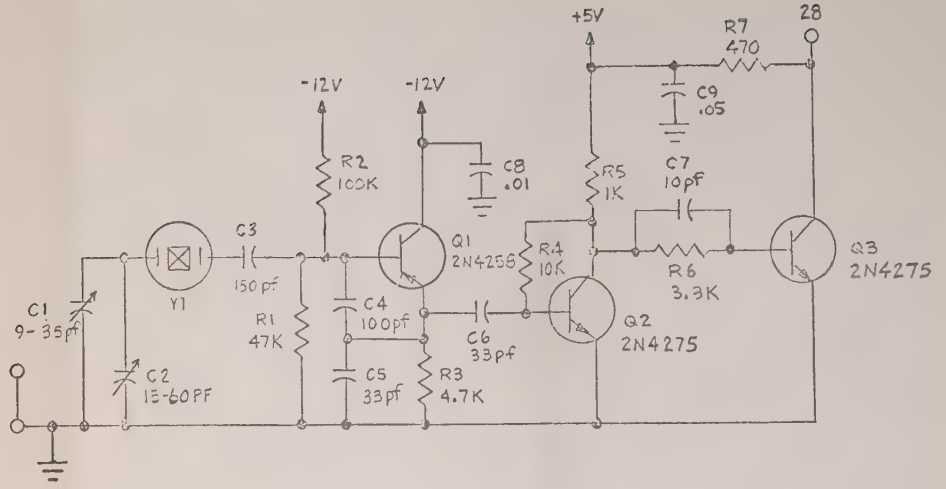
A4, PRESCALER ASSEMBLY SCHEMATIC
DIAGRAM #7-05349901

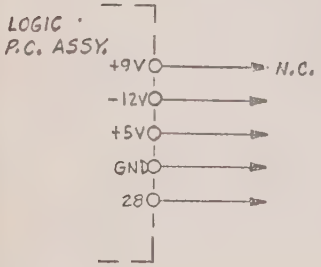




A4, PRESCALER ASSEMBLY
#C05349901

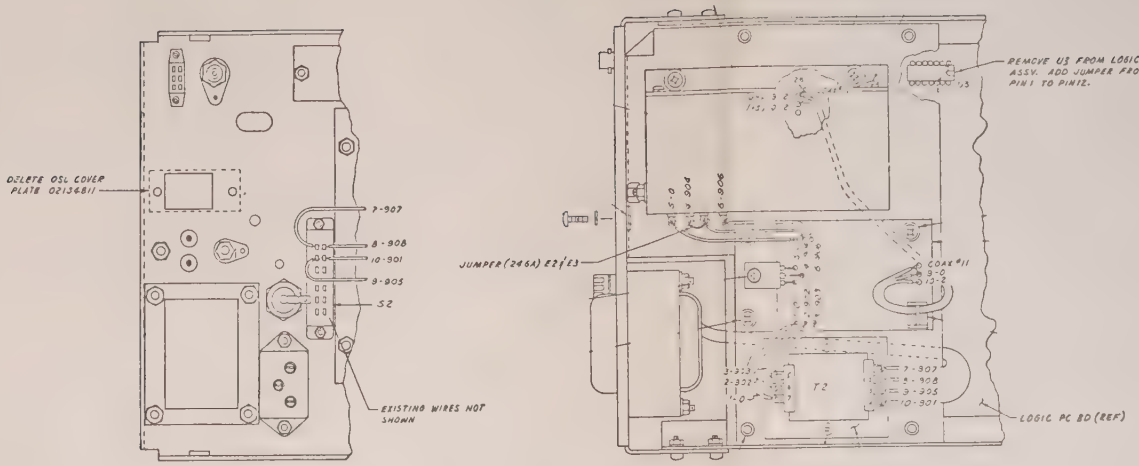






NOTES: UNLESS OTHERWISE SPECIFIED,
1. ALL RESISTORS 1/4 W, 5%.
2. ALL CAPACITORS IN μf.

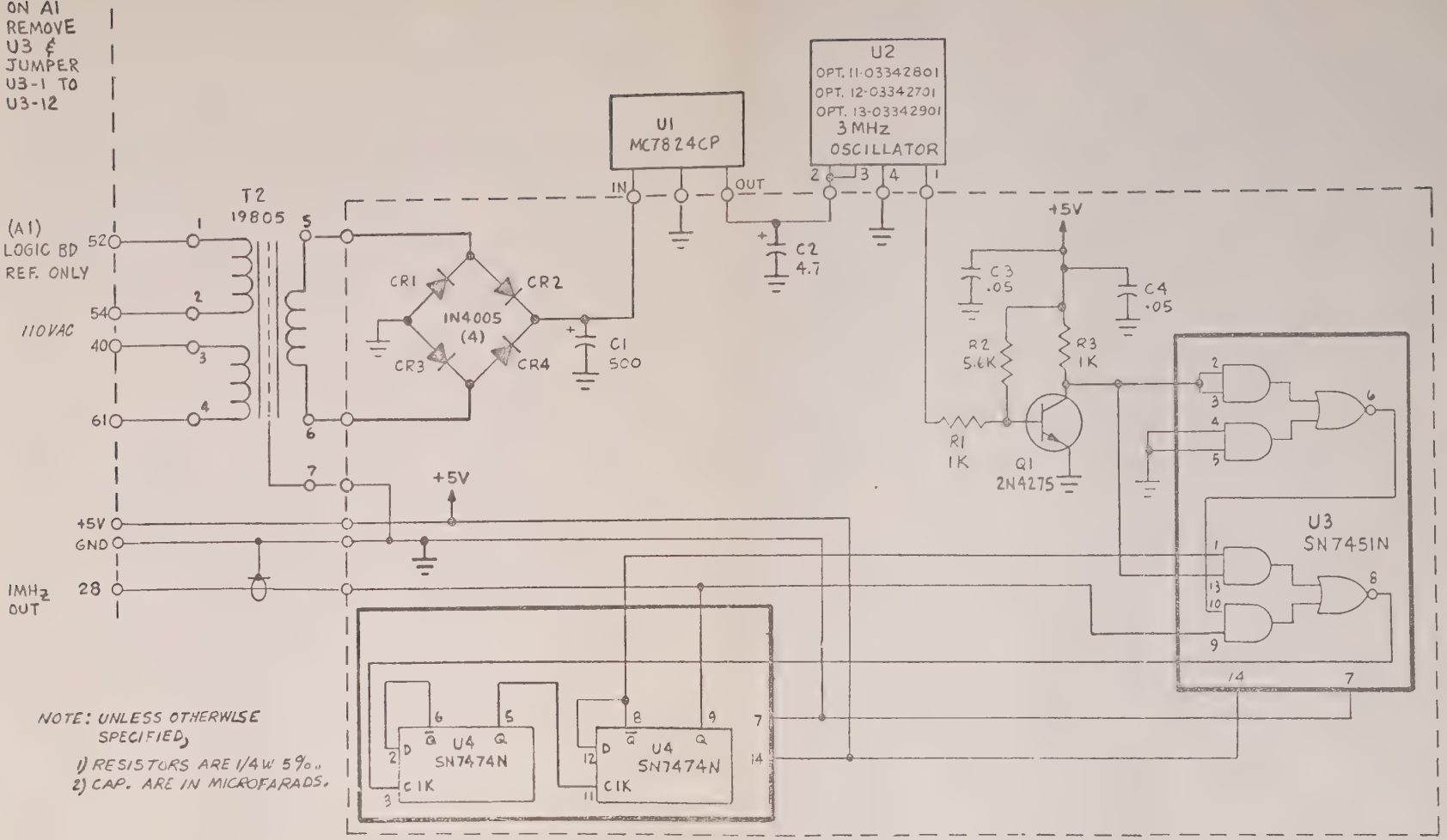
A5, OSCILLATOR, ASSEMBLY AND SCHEMATIC
#B05318301



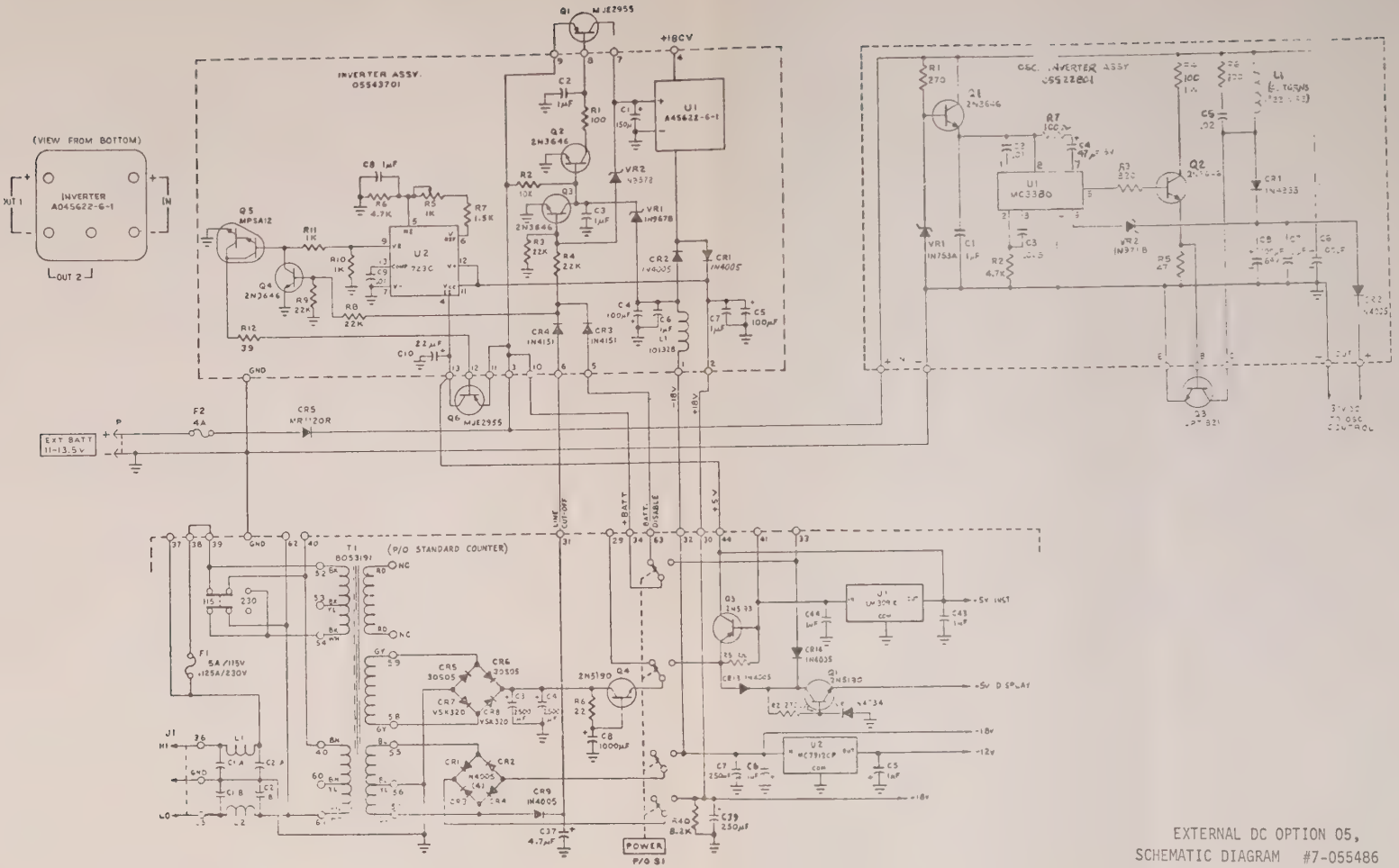
NOTES: UNLESS OTHERWISE SPECIFIED,
1. SOLDER WIRES TO LOGIC BOARD(A1) BEFORE MOUNTING OSC. CHASSIS

ITEM 19	OSCILLATOR INSTALLATION	
OPTION	FINAL ASSY.	OSC. REF.
11	05570211	03342301
12	05570212	03342701
13	05570213	03342301

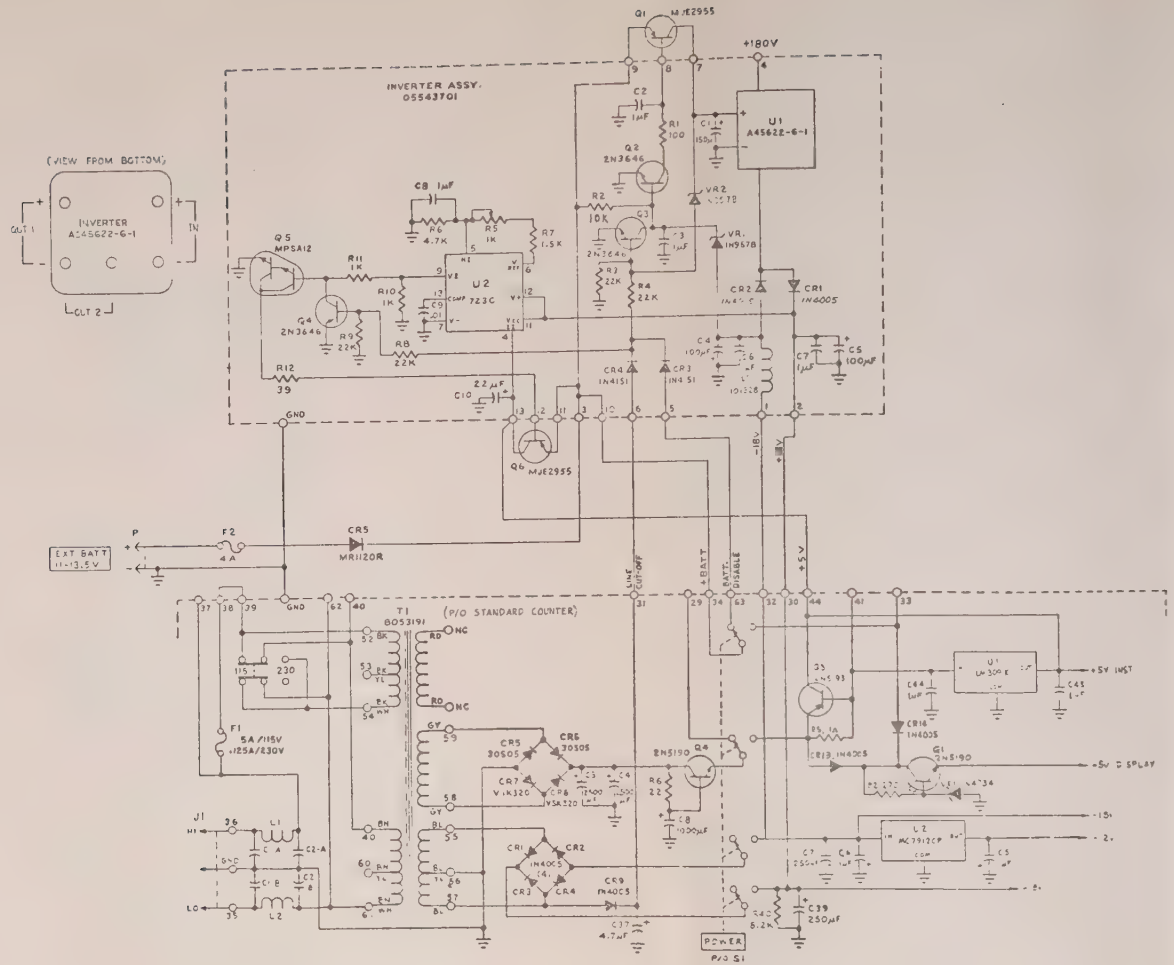
OSCILLATOR ASSEMBLY, OPTION 11, 12, 13
#7-055703



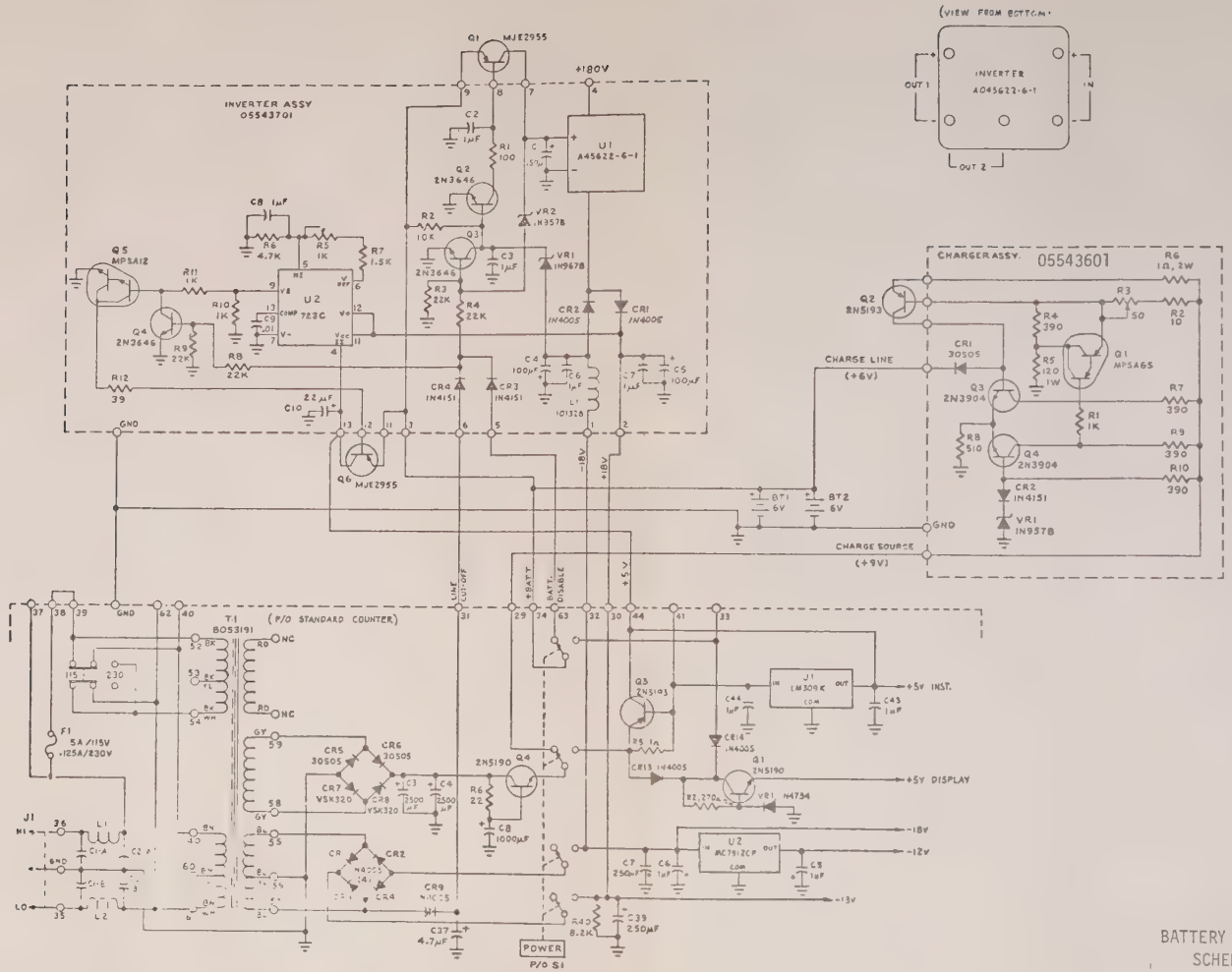
OSCILLATOR ASSEMBLY, OPTION 11, 12, 13
SCHEMATIC DIAGRAM # 7-055703



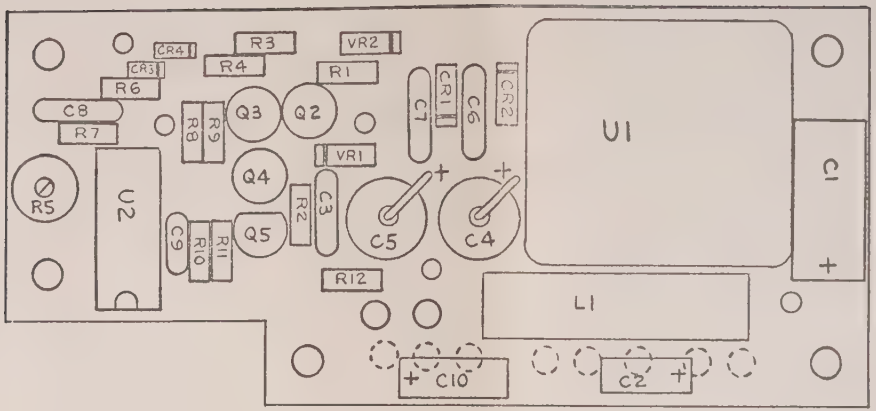
EXTERNAL DC OPTION 05,
SCHEMATIC DIAGRAM #7-055486



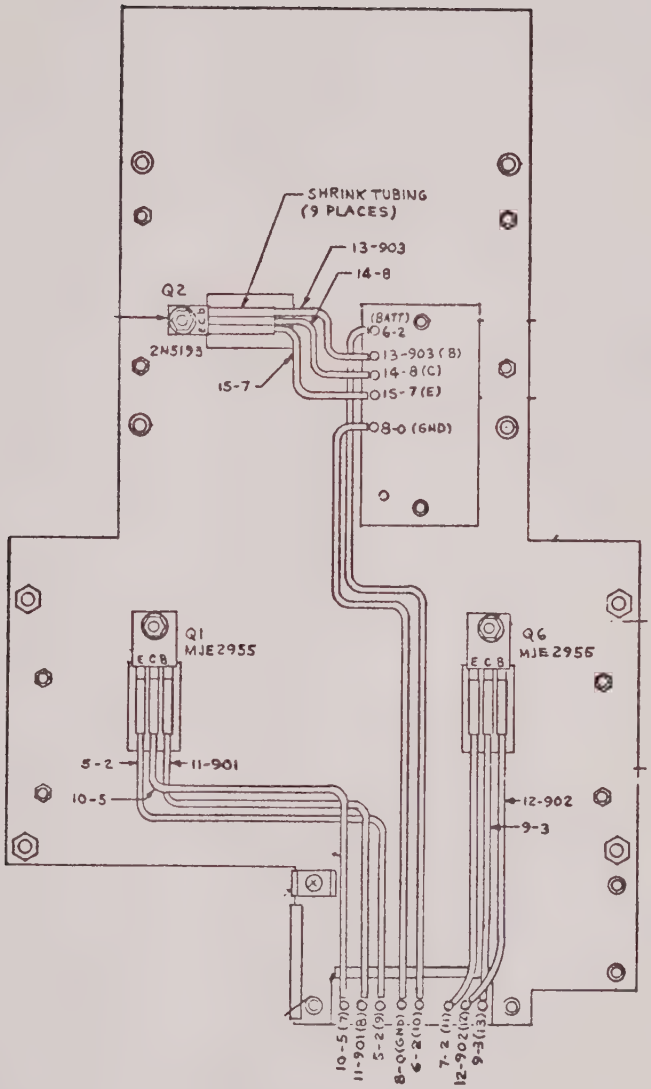
EXTERNAL DC OPTION 07,
SCHEMATIC DIAGRAM

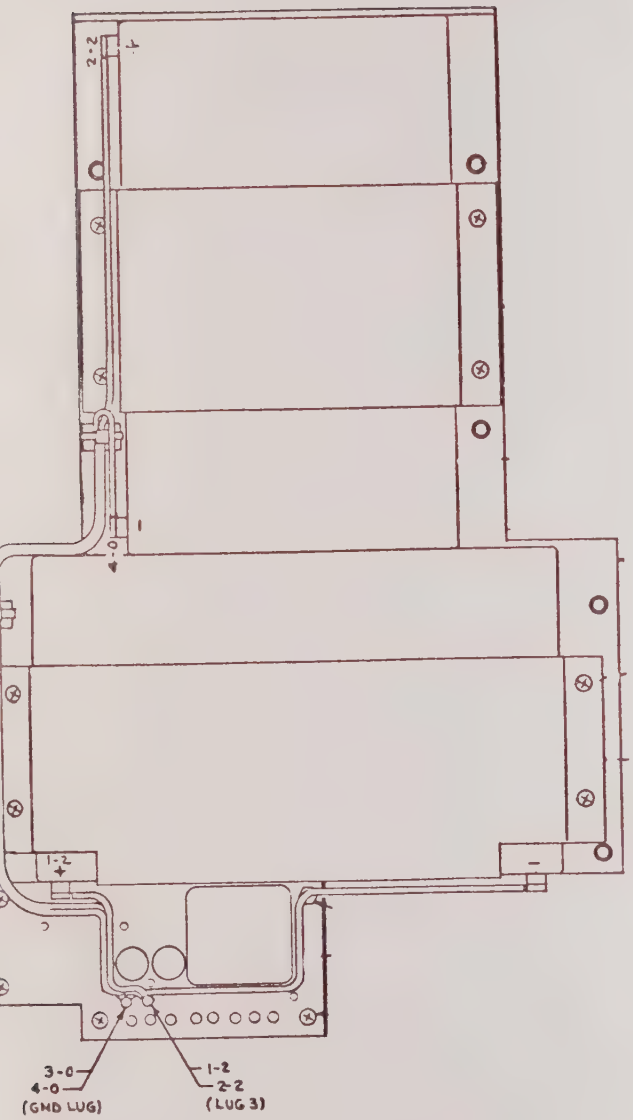


BATTERY PACK OPTION 06,
SCHEMATIC DIAGRAM

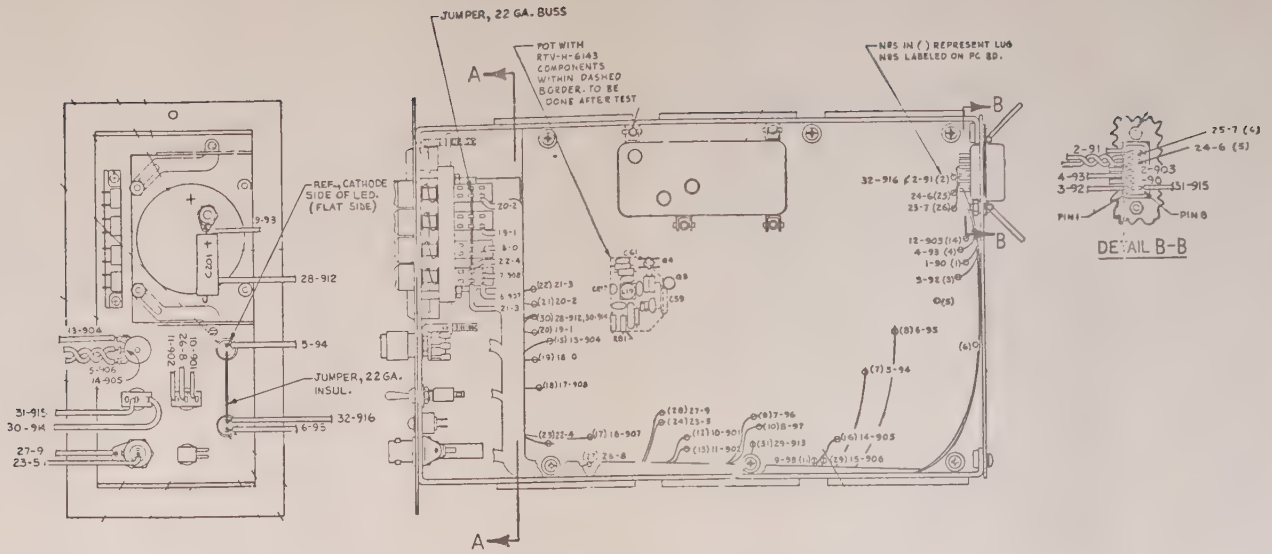


INVERTER ASSEMBLY
#05543701

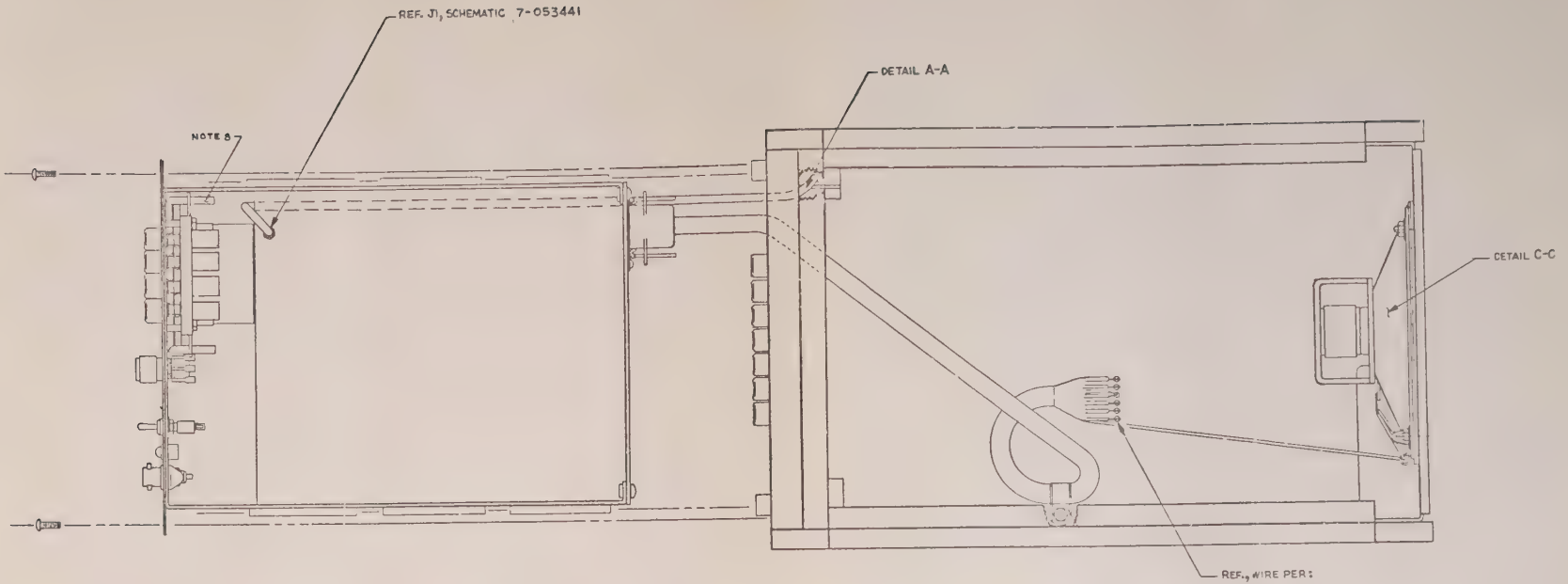

SHRINK TUBING
(9 PLACES)
13-903
14-8
Q2
2N5193
15-7
(BATT)
6-2
13-903 (B)
14-8 (C)
15-7 (E)
8-D (GND)
Q1
MJE2955
E C B
Q6
MJE2955
E C B
5-2
11-901
10-5
12-902
9-3
10-5 (7)
11-901 (8)
5-2 (9)
8-D (GND)
6-2 (10)
7-2 (11)
12-902 (12)
9-3 (13)



OPTION 06
6-VOLT BATTERY PACK ASSEMBLY

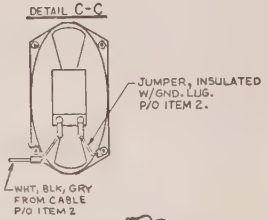


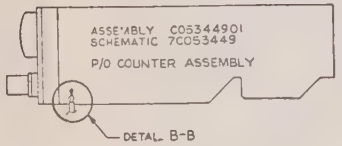
TEST ASSEMBLY, DEVIATION METER



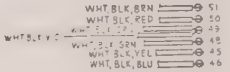
INSTALLATION INSTRUCTION

1. REMOVE BOTTOM COVER ASS'Y.
2. REMOVE HARDWARE FROM BLANK FRONT PANEL AND DELETE PANEL (IF PRESENT)
3. INSTALL SPEAKER, ITEM 3, WITH EXISITING HARDWARE ON REAR PANEL AS SHOWN BY ALIGNING MOUNTING HOLES OF SPEAKER TO MOUNTING HOLES OF SCREEN AND REAR PANEL. MOUNT GND. LUG W/JUMPER AND SMALLER OF 2 CABLE CLAMPS TO SPEAKER AND SOLDER WIRE TO SPEAKERLUG. REF. DETAIL C-C.
4. INSTALL CABLE AND CABLE CLAMP AS SHOWN W/EXISITING HARDWARE. REF. WIRING INFORMATION ABOVE.
5. INSTALL COAX., P/O ITEM 2, TO LUG'S ON PRESCALER PC. ASSY., P/O COUNTER ASS'Y. REF. DETAIL'S A-A & B-B, AND ROUTE DOWN TO J1 OF ADAM PC. ASS'Y. P/O ITEM 1.
6. ALIGN GUIDES ON SIDE OF ITEM 1 TO RAILS OF COUNTER AND SLIDE INTO UNIT. REPLACE FRONT PANEL HARDWARE TO SECURE UNIT INTO PLACE.
7. REPLACE BOTTOM COVER ASS'Y.
8. IF METER CATCHES ON COUNTER SUB PANEL LOOSEN TWO METER MOUNTING SCREWS AND RESEAT METER INTO BOTTOM OF PANEL OPENING. RETIGHTEN METER SCREWS AND INSTALL PER STEPS 5, 6 & 7.

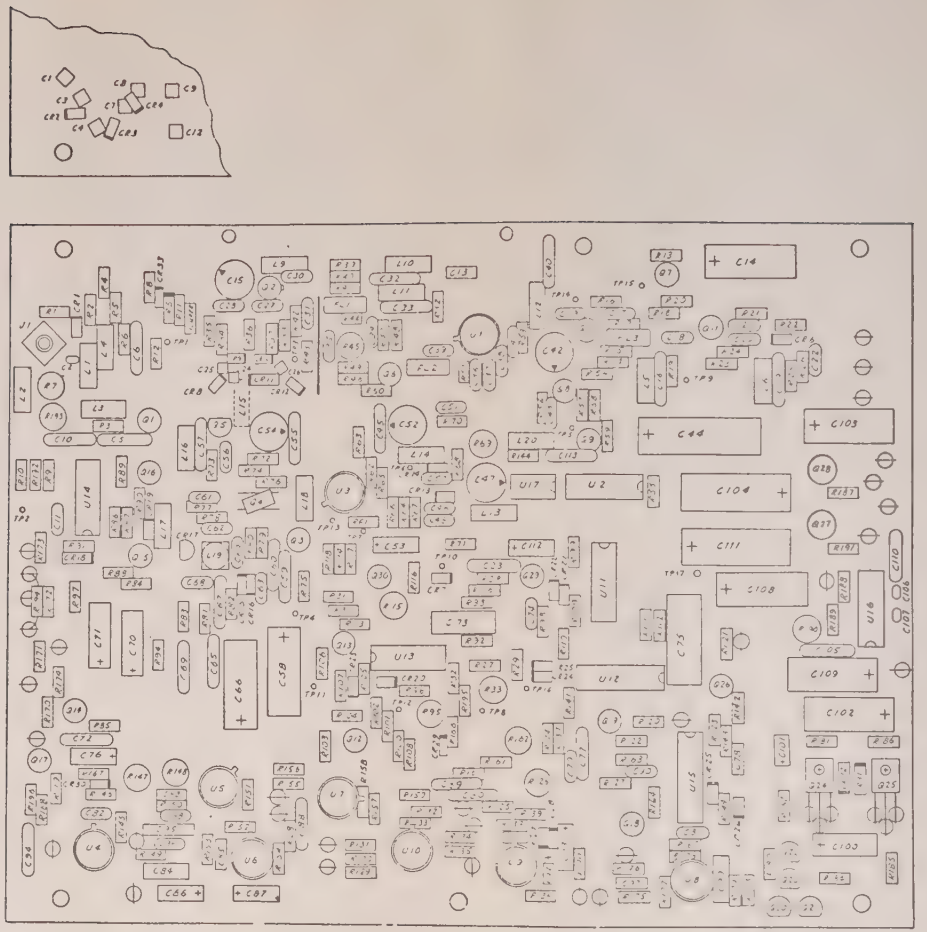




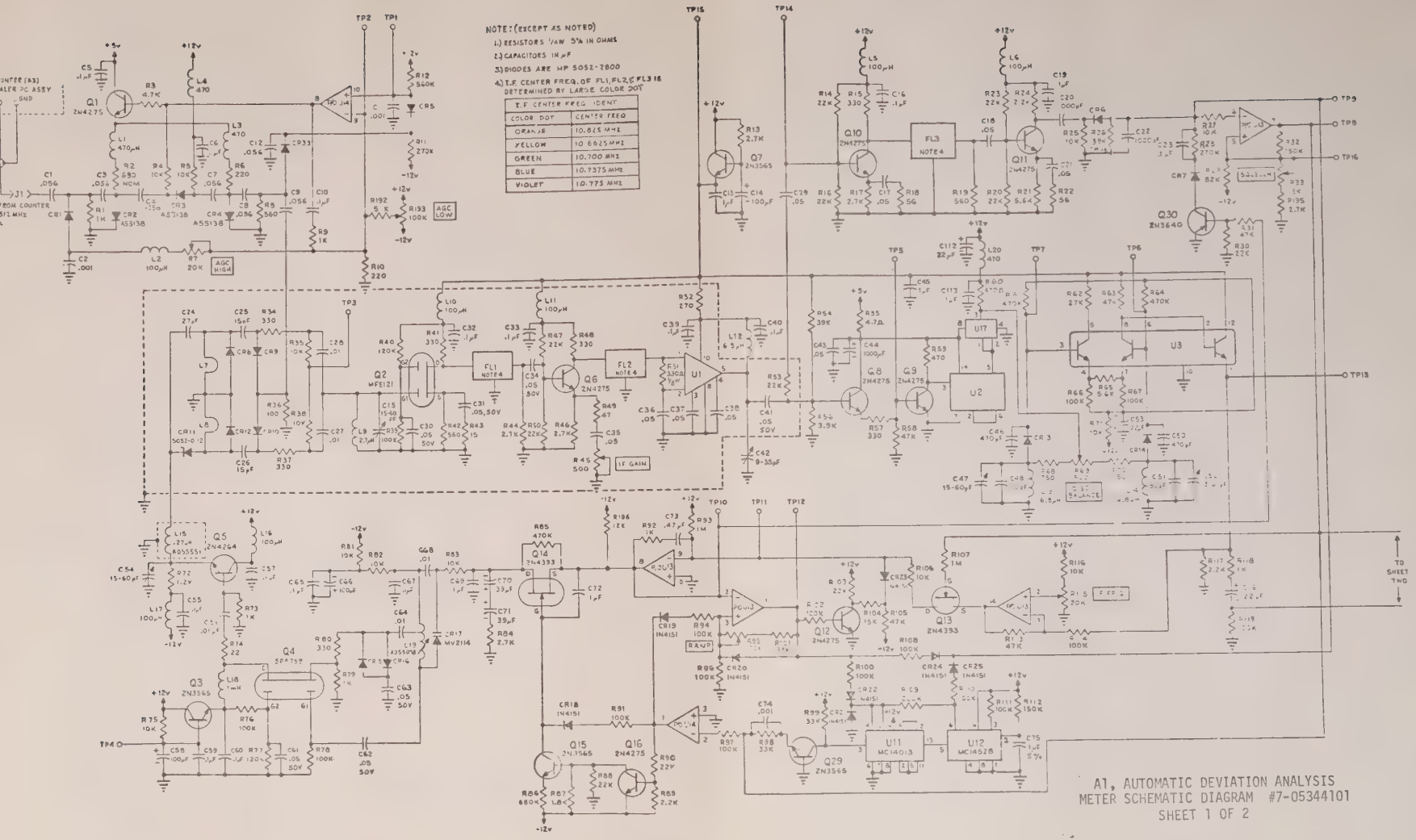
DETAIL A-A
SIDE VIEW SHOWN



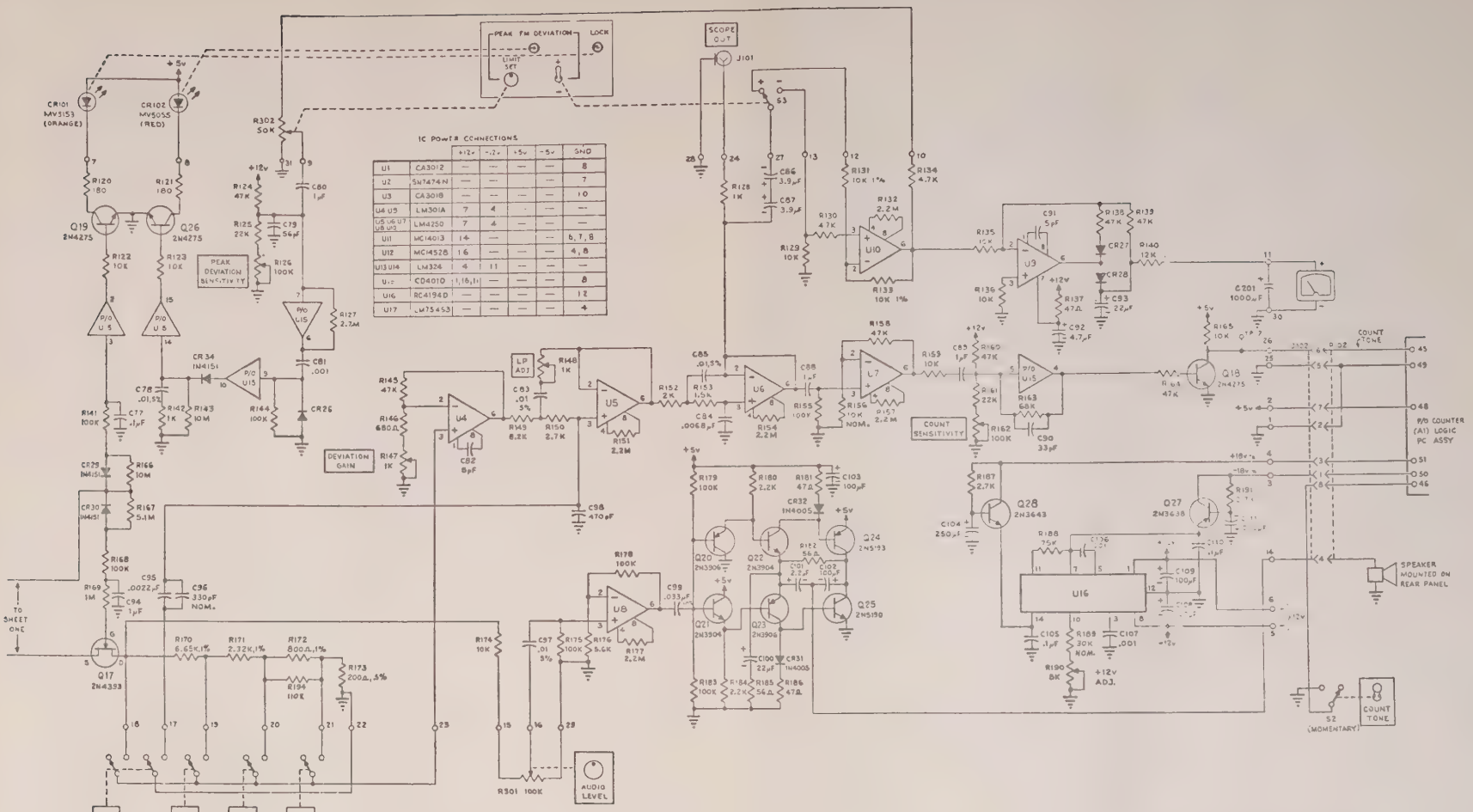
INSTALLATION DRAWING AND
SHIPPING ASSEMBLY
DEVIATION METER #055254



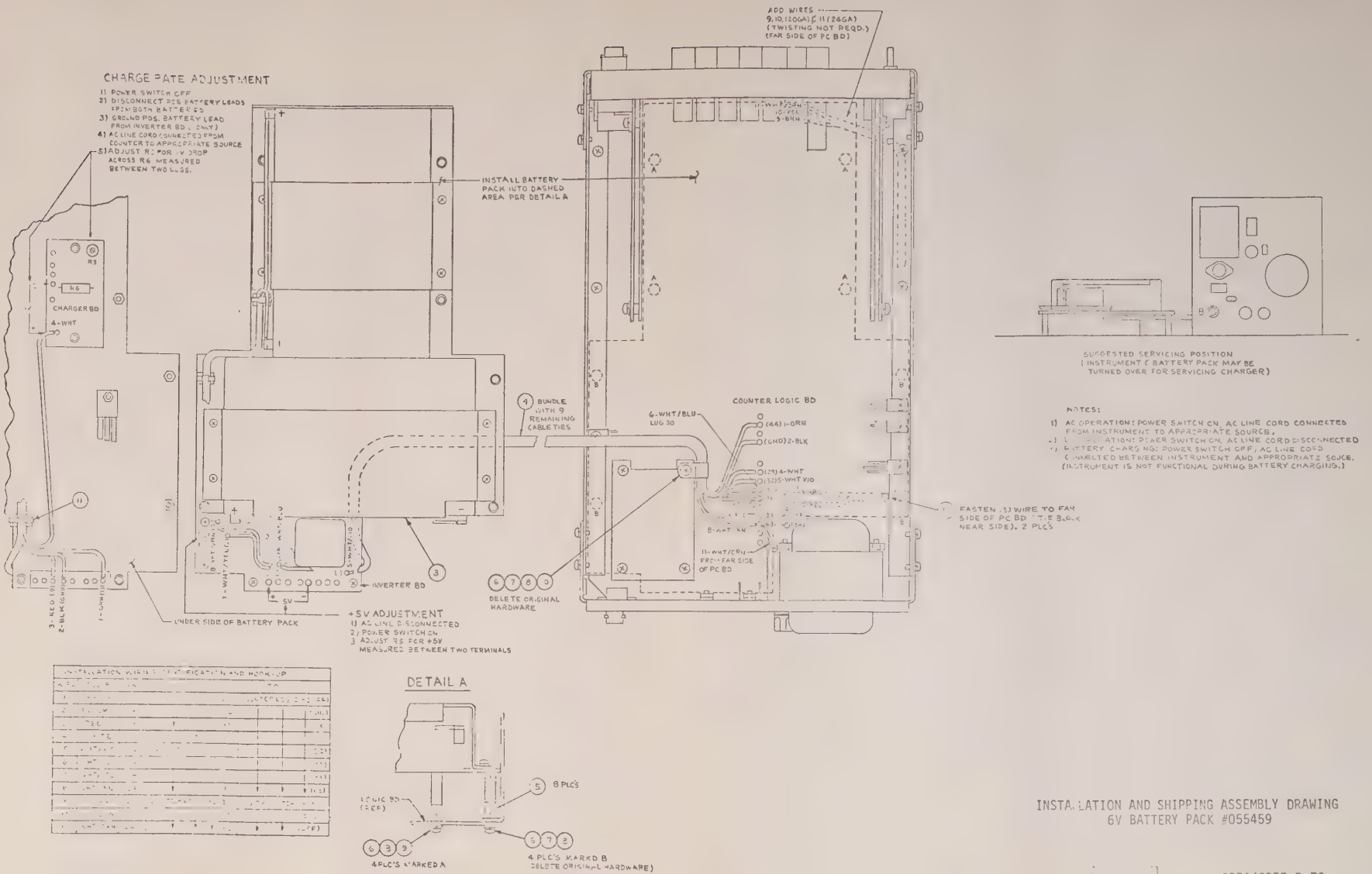
A1, AUTOMATIC DEVIATION ANALYSIS
METER ASSEMBLY #05344101



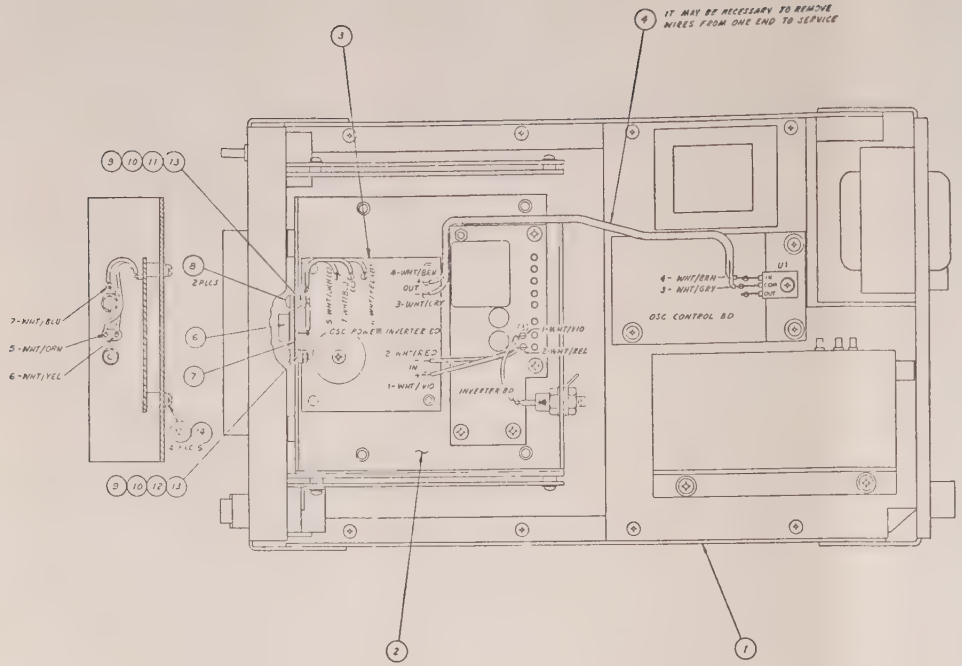
A1, AUTOMATIC DEVIATION ANALYSIS METER SCHEMATIC DIAGRAM #7-05344101 SHEET 1 OF 2


PEAK FM DEVIATION
LOCK
LIMIT SET
SCOPE OUT
J101
IC POWER CONNECTIONS
+12v -12v +5v -5v GND
U1 CA3012 — — — — 8
U2 SN7474N — — — — 7
U3 CA3018 — — — — 10
U4 U5 LM301A 7 4 — — —
U5 U6 U7 U8 U9 LM4250 7 4 — — —
U11 MC14013 14 — — — 6, 7, 8
U12 MC14528 16 — — — 4, 8
U13 U14 LM324 4 11 — — —
U15 CD4010 1, 16, 11 — — — 8
U16 RC4194D — — — — 12
U17 LM7453 — — — — 4
PEAK DEVIATION SENSITIVITY
DEVIATION GAIN
LP ADJ.
COUNT SENSITIVITY
COUNT TONE
+12V ADJ.
AUDIO LEVEL
RANGE KHz
S1
S2 (MOMENTARY)
P/O COUNTER (A1) LOGIC PC ASSY
SPEAKER MOUNTED ON REAR PANEL
TO SHEET ONE

A1, AUTOMATIC DEVIATION ANALYSIS
METER SCHEMATIC DIAGRAM #7-05344101
(SHEET 2 OF 2)


CHARGE RATE ADJUSTMENT
1) POWER SWITCH OFF
2) DISCONNECT P2S BATTERY LEADS FROM BOTH BATTERIES
3) GROUND POS. BATTERY LEAD FROM INVERTER BD. (ONLY)
4) AC LINE CORD CONNECTED FROM COUNTER TO APPROPRIATE SOURCE
5) ADJUST R5 FOR .1V DROP ACROSS R6 MEASURED BETWEEN TWO LUGS.
R3
R6
CHARGER BD
4-WHT
3-RED (+)
2-BLK (GND)
1-ORN (-)
INSTALL BATTERY PACK INTO DASHED AREA PER DETAIL A
ADD WIRES 9, 10, (20GA) & 11 (24GA) (TWISTING NOT REQD.) (FAR SIDE OF PC BD)
4 BUNDLE WITH 9 REMAINING CABLE TIES
6-WHT/BLU LUG 30
COUNTER LOGIC BD
(44) 1-ORN
(GND) 2-BLK
(28) 4-WHT
(32)5-WHT/YLO
8-WHT/BRN
11-WHT/GRN FROM FAR SIDE OF PC BD
FASTEN (3) WIRE TO FAR SIDE OF PC BD (TIE BLOCK NEAR SIDE), 2 PLCS
INVERTER BD
5V
UNDER SIDE OF BATTERY PACK
+5V ADJUSTMENT
1) AC LINE DISCONNECTED
2) POWER SWITCH ON
3) ADJUST R5 FOR +5V MEASURED BETWEEN TWO TERMINALS
6 7 8 9
DELETE ORIGINAL HARDWARE
SUGGESTED SERVICING POSITION (INSTRUMENT & BATTERY PACK MAY BE TURNED OVER FOR SERVICING CHARGER)
NOTES:
1) AC OPERATION: POWER SWITCH ON, AC LINE CORD CONNECTED FROM INSTRUMENT TO APPROPRIATE SOURCE.
2) [illegible] OPERATION: POWER SWITCH ON, AC LINE CORD DISCONNECTED
3) BATTERY CHARGING: POWER SWITCH OFF, AC LINE CORD CONNECTED BETWEEN INSTRUMENT AND APPROPRIATE SOUCE. (INSTRUMENT IS NOT FUNCTIONAL DURING BATTERY CHARGING.)
DETAIL A
LOGIC BD (REF)
5 8 PLC'S
6 3 9
4 PLC'S MARKED A
5 7 2
4 PLC'S MARKED B (DELETE ORIGINAL HARDWARE)

INSTALLATION AND SHIPPING ASSEMBLY DRAWING
6V BATTERY PACK #055459

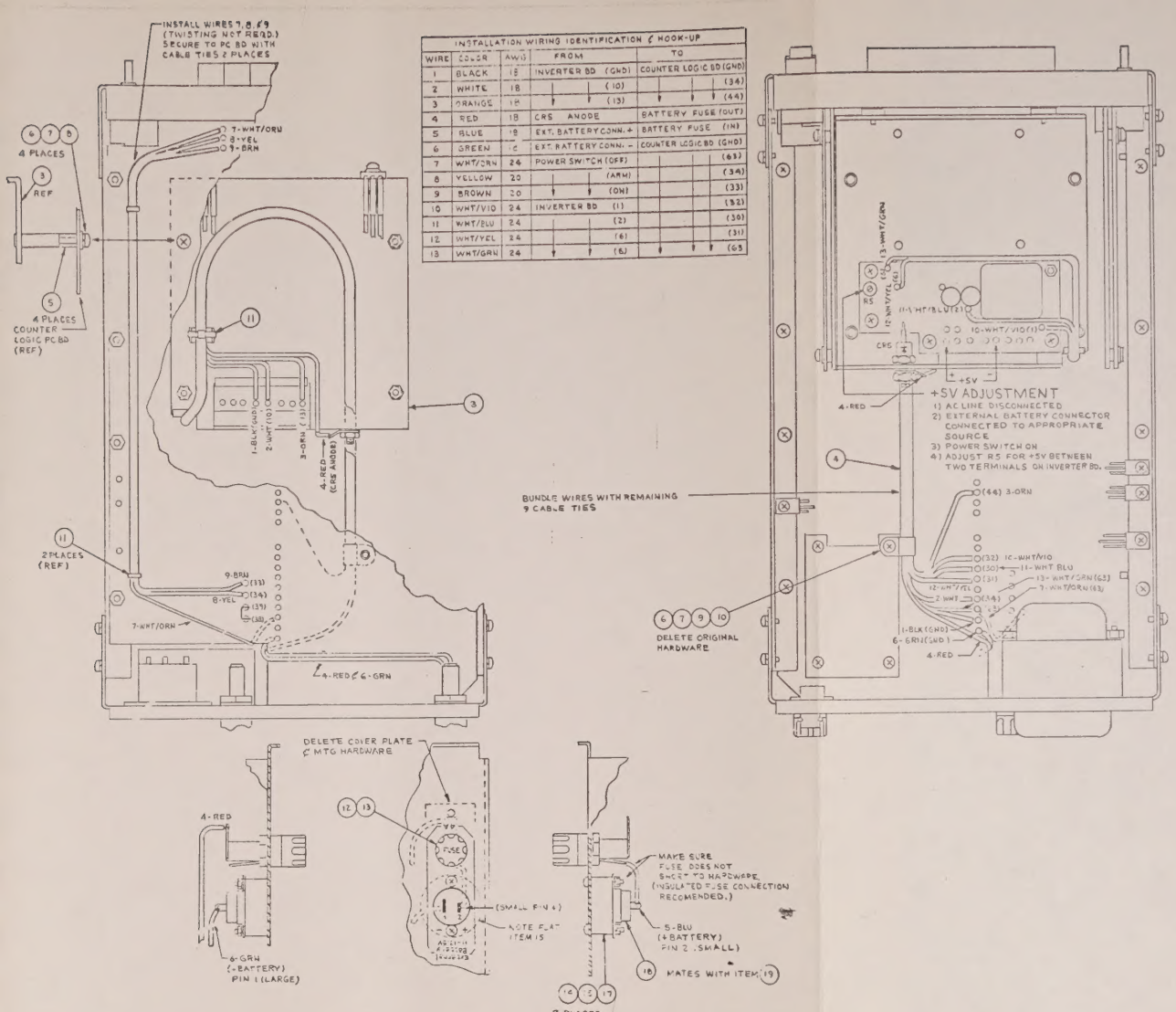


INSTALLATION WIRING IDENTIFICATION & HOOK-UP				
WIRE	COLOR	AWG	FROM	TO
1	WHT/VIO	22	OSC POWER INVERTER +(IN)	INVERTER BD (3)
2	WHT/RED	22	OSC POWER INVERTER GND	INVERTER BD GND
3	WHT/GRY	22	OSC POWER INVERTER GND	OSC CONTROL BD COM (U1)
4	WHT/BRN	22	OSC POWER INVERTER +(OUT)	OSC CONTROL BD IN (U1)
5	WHT/ORN	22	J3 - E	OSC POWER INVERTER E
6	WHT/YEL	22	J3 - B	OSC POWER INVERTER B
7	WHT/BLU	22	J3 - C (SOLDER LUG)	OSC POWER INVERTER C

NOTES:

1. FOR EXTERNAL DC OPERATION:
   A) AC LINE CORD DISCONNECTED.
   B) EXTERNAL BATTERY CONNECTED TO APPROPRIATE DC SOURCE.
   C) POWER SWITCH ON.
2. AS LONG AS DC POWER IS APPLIED TO EXTERNAL BATTERY CONNECTOR, THE OSCILLATOR POWER INVERTER WILL OPERATE EVEN WHEN POWER SWITCH IS TURNED OFF.
3. FOR AC LINE OPERATION:
   A) AC LINE CONNECTED TO APPROPRIATE AC SOURCE.
   B) POWER SWITCH ON, INSTRUMENT OPERATES FROM AC SOURCE EVEN WHEN AN EXTERNAL DC SUPPLY IS APPLIED TO THE EXTERNAL BATTERY CONNECTOR

INSTALLATION AND SHIPPING ASSEMBLY DRAWING
EXTERNAL DC SUPPLY, OPTION 05 #055478



INSTALLATION WIRING IDENTIFICATION & HOOK-UP				
WIRE	COLOR	AWG	FROM	TO
1	BLACK	18	INVERTER BD (GND)	COUNTER LOGIC BD (GND)
2	WHITE	18	(10)	(34)
3	ORANGE	18	(13)	(44)
4	RED	18	CRS ANODE	BATTERY FUSE (OUT)
5	BLUE	18	EXT. BATTERY CONN. +	BATTERY FUSE (IN)
6	GREEN	18	EXT. BATTERY CONN. −	COUNTER LOGIC BD (GND)
7	WHT/ORN	24	POWER SWITCH (OFF)	(63)
8	YELLOW	20	(ARM)	(34)
9	BROWN	20	(ON)	(33)
10	WHT/VIO	24	INVERTER BD (1)	(32)
11	WHT/BLU	24	(2)	(30)
12	WHT/YEL	24	(6)	(31)
13	WHT/GRN	24	(5)	(63)

NOTES:
1) FOR EXTERNAL DC OPERATION:
   A) AC LINE CORD DISCONNECTED
   B) EXTERNAL BATTERY CONNECTED TO APPROPRIATE DC SOURCE
   C) POWER SWITCH ON.
2) FOR AC LINE OPERATION:
   A) AC LINE CONNECTED TO APPROPRIATE AC SOURCE
   B) POWER SWITCH ON, INSTRUMENT OPERATES FROM AC SOURCE EVEN WHEN AN EXTERNAL DC SUPPLY IS APPLIED TO THE EXTERNAL BATTERY CONNECTOR.

INSTALLATION AND SHIPPING ASSEMBLY DRAWING
EXTERNAL DC SUPPLY, OPTION 07 #055475

www.manualsplus.com
1025093